UNIVERSITY OF ALBERTA

AN UNDERSTANDING OF HOW JUNIOR HIGH SCHOOL STUDENTS EXPERIENCE THE LIBRARY RESEARCH PROCESS

BY

KAREN LOERKE

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

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Best wishes
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "An Understanding of How Junior High School Students Experience the Library Research Process" submitted by Karen Loerke in partial fulfillment of the requirements for the degree of M. Ed. in Elementary Education.

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ABSTRACT

A model of the library research process was developed by Kuhlthau through a number of studies conducted with high school and university students and with adult learners. Included in Kuhlthau's model are the feelings, thoughts and actions learners experience at each stage. Kuhlthau's findings indicated that the stage in the research process that appeared to give learners the mostly difficulty was the formulation of a focus. Because Kuhlthau only observed high school, university and adult learners, how junior high school students experience the library research process and how they reach a focus warranted investigation.

The literature on the library research process provided an understanding of the stages in the research process and why students find it difficult to form a focus. Theories and findings related to cognitive development and self-regulated learning provided a basis from which to teach the library research process appropriate for junior high students. This study resulted from educators working together to improve education by change, using an action research approach. Four teachers and the school's teacher-librarian formed an action research team, planning, observing, implementing and reflecting on how four classes (two grade seven and two grade eight) worked through the research process. In addition, the researcher used the data collected to extend the themes noted in the action research project using a content analysis approach.

It was found that students in junior high school experience the same thoughts and feelings as do the high school, university and adult learners described in Kuhlthau's studies. The study also confirmed that narrowing a topic was the most difficult stage in the library research process. Grade seven students found it more difficult to reach a focus than did the grade eight students. Students in both grades needed a structured approach, including many checkpoints, to monitor progress. Library research appears to be one strategy for promoting autonomous learning and for teaching students to think.

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CHAPTER ONE

Statement of the Problem

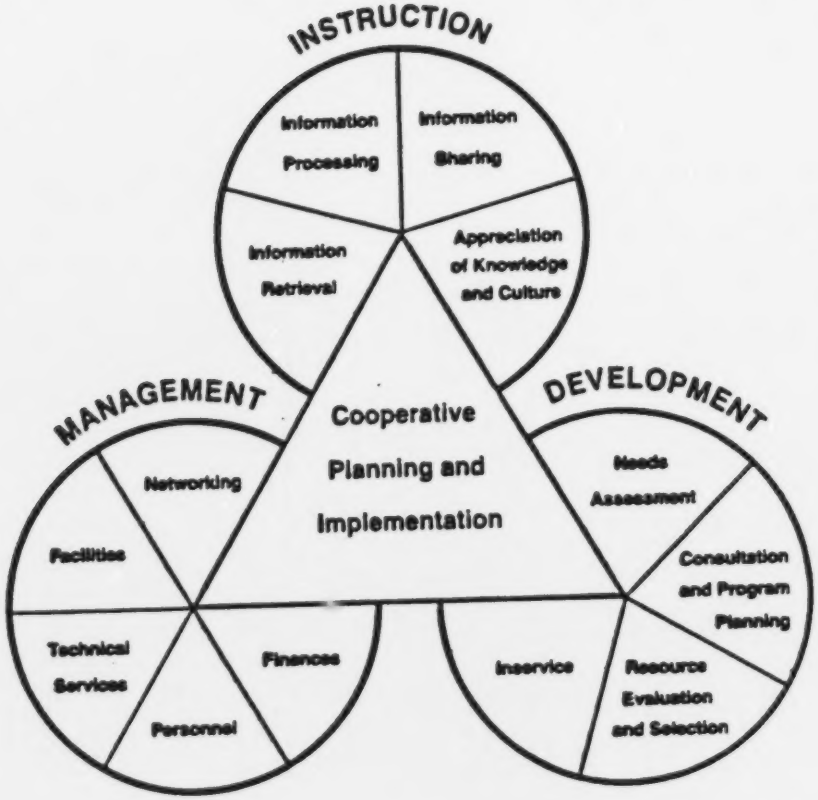
Introduction

Teachers and teacher-librarians have long been involved in developing programs of library instruction to help students to use the library. Three models of library instruction have emerged over the past decades: a source approach, a pathfinder approach and a process approach (Kuhlthau, 1987a). The traditional source and pathfinder approaches have emphasized how to use specific sources and particular libraries. One major concern in relation to these two approaches is that students may find it difficult to transfer their knowledge to different resources and libraries. This problem of transferability of skills has not just been noted for elementary and secondary pupils but with university students as well. It seems that many students at the university level do not understand that materials are organized in similar ways in all libraries and that skills that have been learned previously can be applied to new tasks (Mellon, 1987). Because of this, there has been a shift in library instruction from teaching skills in isolation to using a more integrated approach. In 1985 this integrated approach was outlined for Alberta schools in a school library program model developed by Alberta Education.

This model, Focus on Learning (Figure 1), demonstrates how a school library program can provide "systematic instruction and practice in locating, processing and sharing information in all formats" (Alberta Education, 1985, p. 7).

Figure 1

An Integrated Program Model for School Libraries



Note. From Focus on learning: An integrated program model for Alberta school libraries (p. 5) by Alberta Education, 1985, Edmonton: Author.

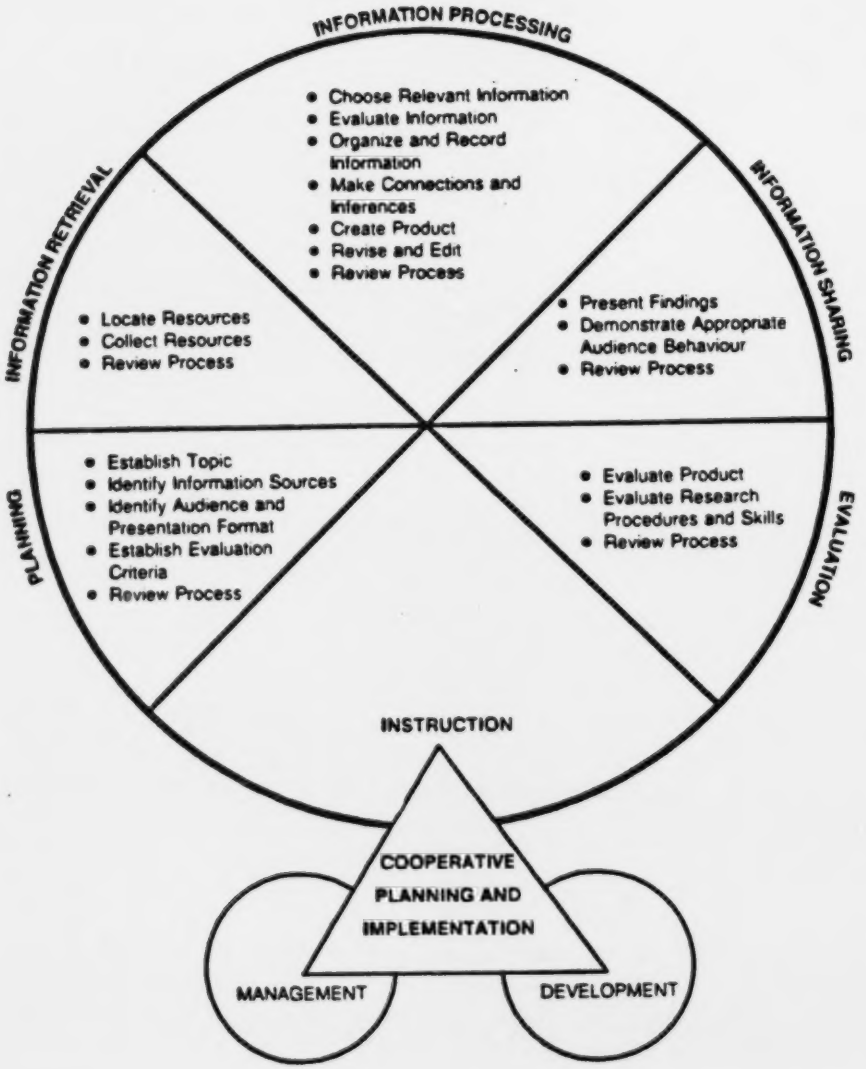
Three components form this model: instruction, development and management. The primary focus of this model is the instructional component. However, to have a successful instructional program in the school library, careful development planning and effective management must be in place. Focal to the three components in the model is the concept of cooperative planning and implementation. Essential to an integrated school library program is the commitment of the school library personnel, teachers and administrators, all working together planning and implementing a resource-based instructional program.

More recently Alberta Education has examined the instructional component of this integrated library model, and has published a document dealing specifically with the research process. This document provides schools with a model for teaching students how to do library research (Alberta Education, 1990).

Focus on Research uses a process approach to library research that emphasizes using information for thinking and learning (Figure 2). The process approach to library research is based on cognitive learning theory dealing with how an individual thinks and learns (Blakey & Spence, 1990).

Figure 2

A Developmental Approach to Research



Note. From Focus on research: A guide to developing students research skills (p. 3) by Alberta Education, 1990, Edmonton: Author.

Kuhlthau has developed a six stage model of the research process. In this model, Kuhlthau not only outlines the activities and strategies but also the thoughts and feelings students commonly experience at each stage (Kuhlthau, 1985b). The six stages of Kuhlthau's model are: task initiation, topic selection, exploring information, forming a focus, collecting information, and preparing to present (Table 1). Kuhlthau has extended this model to include a seventh stage, assessing the process. More detailed explanations of the stages, tasks, feelings and strategies of Kuhlthau's model are provided in Appendix 1.

Recent studies conducted by Kuhlthau indicate that students often experience difficulty at the pre-focus stages of the research process. The pre-focus stages refer to the first three stages in Kuhlthau's model; receive assignment, select topic and explore for focus. As students explore their topics during the pre-focus stages, students thoughts change from a vague understanding to a clear view of their topic. The formulation of a focus, or what is often termed limiting the topic, appears to give students the most trouble. Students experience confusion and doubt, up until they come to a specific point of view on their topic.

Kuhlthau's studies of the research process indicate that students experience different feelings during each stage of the research process. When students are first given their assignments they commonly experience feelings of uncertainty. They then seek relevant information in order to select a topic and a focus. Once students select the general topic area they experience feelings of optimism. However, further exploring of this topic is needed to develop a focus. This appears to lead to feelings of confusion. It is not until a student forms a focus that there is a sense of direction and confidence. It is at this point that students seek more pertinent information. As well, at this point students become more interested in their research papers. Finally, when students are prepared to present the information they have researched, they feel a sense of relief and of satisfaction or dissatisfaction (Kuhlthau, 1985b).

Table 1

Timeline of the Library Research Process

Stages	Receive Assignment	Select Topic	Explore for Focus	Form Focus	Collect Information	Prepare to Present
Feelings	uncertainty	optimism	confusion/ frustration/ doubt	clarity	sense of direction/ confidence	sense of satisfaction or dis-satisfaction
Thoughts		ambiguity ----------			specificity --	Increased interest
Actions	seeking relevant information ----------				seeking pertinent information	

Note. From Teaching the library research process (p. 19) by Carol Kuhlthau, 1985, West Nyack: The Center for Applied Research in Education. Copyright 1985 by Carol Kuhlthau. Reprinted by permission.

Kuhlthau centered her studies on high school and university students and adult learners. How the learner experiences this process at the junior high school level had not previously been explored.

Purpose of the Study

The central focus of this study was to extend Kuhlthau's research to develop an understanding of how junior high school students work through the research process. Several questions were addressed in this study. These included:

1. How do junior high school students progress through a library research project? Are the stages and associated feelings that junior high students experience during the research process similar to those experienced by the high school and university students in Kuhlthau's studies?

2. How do junior high school students limit a research topic or come to a focus?

3. What teaching methods and strategies can teachers and teacher-librarians use to help students come to a focus?

Significance of the Study

Educators have noted for some time now the rapid increase in information. Teachers can no longer teach their students all that they will need to know for their future. As a result, new teaching strategies have emphasized a process approach to learning. Developing skills and strategies to deal with information is essential for preparing students to function better in society. Library research is one method that facilitates such learning. It is important then that teachers and teacher-librarians look more carefully at the research process to discover how students learn the process as well as what problems they may encounter. There have been studies examining how high school, university and adult learner learners experience the library research process; however, no studies of this kind have been undertaken for junior high school learners. The findings of this study extend the research completed by Kuhlthau in the past decade.

Delimitations of the Study

This study investigated how junior high school students developed a focus during the research process. Findings from Kuhlthau's studies of high school, university and adult learners indicate that limiting the topic is the most difficult stage in the research process. Therefore, this study primarily centered on the focus stage. It involved students in grades seven and eight in one urban junior high school in Alberta. The students were involved in a library research project, as part of a science unit, over a three month period. The library research project was jointly planned, taught and evaluated by the four science teachers and the school's teacher-librarian.

Limitations

This research was limited by the extent to which the action research team were able to observe, interpret and reflect while working with the students involved with their library research projects. Every attempt was made to observe pertinent student activities and to record student feelings during the data collection period.

Also limiting this study is the degree to which students understood the surveys, perception questionnaires, flowcharts and final evaluation, and were willing or able to record their feelings in daily journals. To avoid confusion when students were completing the surveys, perception questionnaires, flowcharts and final evaluations, each question was explained and students proceeded under the researcher's direction. Time and encouragement was provided for students to write in their response journals.

Additional interpretations of the surveys, perception questionnaires, student essays, response journals and student final evaluations were made by the researcher. The

researcher's ability to interpret the data, even though these findings were verified with the thesis advisor, also limits this study.

Summary

Teachers and teacher-librarians are using library research as one method to encourage self-regulated learning. As students will be bombarded with more and more information, they must learn to deal with the information that will confront them. Therefore, teaching research skills and strategies is important in developing lifelong learners and wise decision makers. Teachers will need to reflect on this process to help students in their studies. Models of library research instruction must therefore be developed, studied and refined that are appropriate for the various age groups of children in our schools. Kuhlthau's widely accepted model, developed from work with young adult and adult learners, was investigated for its validity at the junior high school level. In particular, how students come to a focus was the primary concern for this study.

Organization of the Report

This report is divided into seven chapters. Chapter one provides the background information for this study, explaining the nature of the problem, the purpose and significance of the study, as well as the limitations and delimitations.

Chapter two reviews the literature related to the statement of the problem outlined in chapter one. Four areas are addressed: findings on the research process, theories explaining why limiting the topic is difficult, theories on the cognitive development of adolescents, and findings related to developing self-regulated learners. This literature

review provides insight into how adolescents learn and develop intellectually and emotionally.

This study was conducted using an action research approach. Chapter three explains the stages of an action research project. The combination of action and research is a process through which educators work together to improve education by change. How educators can engage in the process of action research is explained in this chapter. The sample selection, data collection, data analysis and ethical considerations are also outlined.

Chapter four is a case study of how the action research team worked through the stages of the action research project. This case study provides the framework for how this study was carried out.

In addition to working with the action research team, the researcher continued to analyze the data provided through the action research project. The purpose of this analysis was to extend the themes noted in the action research project. The findings from this analysis are described in chapters five and six. Chapter five outlines the overall results of how the grade seven and eight students experienced the library research project. Chapter six describes individual student stories, providing a glimpse into the student's feelings and thoughts throughout each stage in the library research process.

Chapter seven summarizes the findings from this study. Implications are classified into two general categories. First there are considerations for teachers and teacher-librarians and second there are recommendations for school wide policies. A bibliography and an appendices section have been included at the end of the study. These sections are referred to throughout the study.

CHAPTER TWO

Literature Review

Introduction

This literature review centers on four main areas. Findings related to the library research process are addressed first. Next theories and research findings to explain why limiting of a topic, one stage in the research process, is so difficult are examined. Because this study involved students in junior high school, the cognitive development of adolescents is investigated. Lastly, since the goal of the process oriented approach to teaching is to promote self-regulated students, findings in the area of autonomous learning are reviewed.

The Research Process

The seven stage model of the research process, developed by Kuhlthau, outlines the activities, strategies, thoughts and feelings students commonly experience at each stage (Kuhlthau, 1985b). One theme emerging from Kuhlthau's studies is the difficulty that students experience when forming a focus. Here are comments from several students that typify this experience. "If I learned anything from that paper it is you have to have a focus. You have to have something to center on. You can't just have a topic" (Kuhlthau, 1985a, p. 40). "I was so confused. . . . I had no idea what direction I was going in" (Kuhlthau, 1988a, p. 238).

Students in the early stages of the research process experience feelings of frustration, doubt and confusion. Anxiousness does not change to optimism until students

reach a focus (Kuhlthau, 1988b). Reaching a focus appears to be a turning point for many students in their research (Kuhlthau, 1988b). Another study of high, middle, and low achieving high-school students found that "the more students' confidence rose during the process, the more focused were their papers and the higher their grades were found to be. Students' increasing confidence relates to their developing thoughts and their learning about the topic" (Kuhlthau, 1989a, p. 226).

"Library anxiety" has also been noted by other researchers. Mellon (1986) in her study of six thousand students in a university in the southern United States discovered that 75% to 80% of the students reacted to the idea of library research with terms such as "lost", "helpless", and "confused". They felt that they alone did not understand how to use the library. They felt everyone else knew how to use the library and feared that if they asked questions they would appear stupid. Not knowing how to select or define a topic and not feeling comfortable enough to clarify a topic with a professor or a librarian, students experience much anxiety when faced with completing a research paper. "Selecting or defining a topic for research is a formidable task which students just do not know how to start. . . . More than one scared freshman has begged the reference librarian "to tell me what I'm interested in" (Mellon, 1987, p. 76).

Mellon has suggested that previous models of library instruction have ignored the emotional state of the researcher. She has stated that librarians must understand the feelings of the researcher before effective programs of library instruction can be developed.

Using Kuhlthau's approach (1988b) from her study of high school seniors and college students, the researcher interviewed one university student working on a major research paper for a graduate level course. In order to investigate the pre-focus stages of the research process, questions were selected and adapted from Kuhlthau's research that specifically concentrated on the emotional state of the learner when trying to limit a topic.

This pilot study revealed similar results to those collected by Kuhlthau in her longitudinal case study (Loerke, 1992).

The student in this pilot study had been given the task of writing a research paper for a graduate level course in educational administration. Although he was not anxious about the process, he was not certain either. His general topic was chosen from personal experiences and from prior research. Although the student had a general idea of his topic, he was not sure of his exact focus. The student said that personalizing the topic was the most difficult part for him and so he expected that this stage would take time. He felt that he was not like other people in that it took him a long time to mull over a topic, and this frustrated him (Loerke, 1992). What the student did not realize is that this is common among students. Like the college students in Kuhlthau's study, this student attached a "negative connotation to the preparatory thinking and mulling that characterizes this stage" (Kuhlthau, 1988b, p. 300).

Coming to a focus then is an important and difficult stage in the research process. It is also accompanied by feelings of anxiety and confusion. It is not a process that is experienced as a neat step-by-step progression, but one that develops from a spiraling of building thoughts (Kuhlthau, 1985a). How people learn and how they solve problems can shed light on how information is processed and personalized. Learning theory and problem solving theory help to explain why achieving a focus in the research process is so difficult.

Difficulties Related to Limiting the Topic

Kelly's Personal Construct Theory (1963) presents an explanation of how people assimilate new experiences. In Kelly's view people are active observers of the world

trying to make sense of it from a scientist's viewpoint. This observed world is not constant, but changing.

> Man creates his own ways of seeing the world in which He lives. . . . He builds constructs and then tries them on for size. . . . Man seeks to predict and thus control, the course of events. It follows then, that the constructs which he formulates are intended to aid him in his prediction efforts. (Kelly, 1963, p. 12)

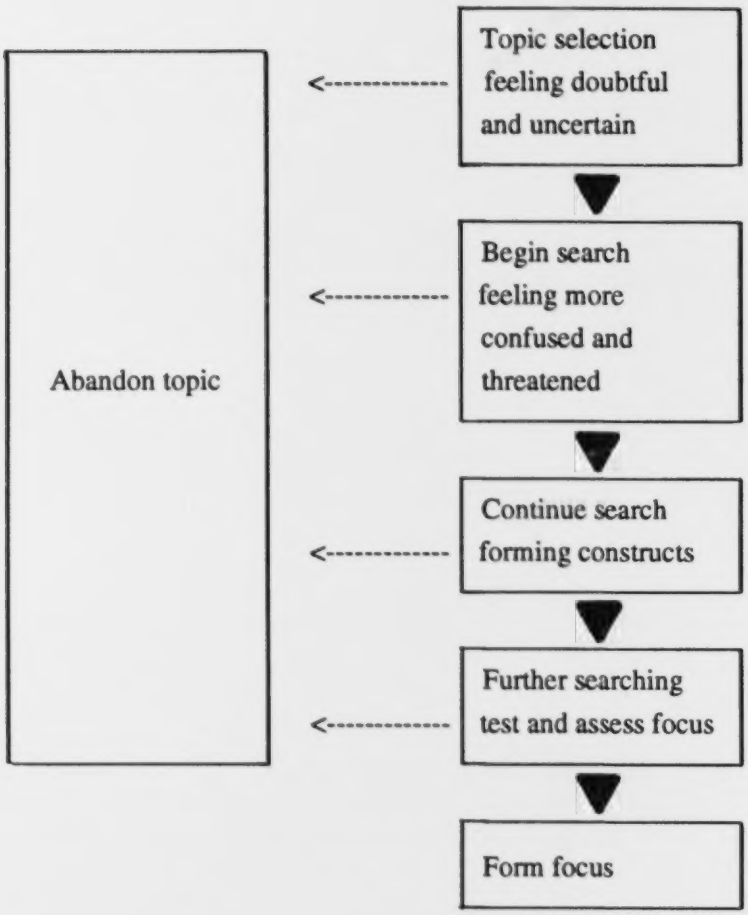
When students are asked to write a research paper, they begin this process of assimilating a new experience. Kelly involved both the emotion and the intellect in his model. Kuhlthau's research process model of library instruction reflects Kelly's Personal Construct Theory.

> The person searching for information in order to address a problem is in the process of construction. . . . During a search for information, the user is involved in forming new constructs and altering those previously held. . . . In light of PCT [Personal Construct Theory], however, anxiety is a natural and integral part of the information search process. (Kuhlthau, 1990, p. 6)

What does this mean for a student beginning a research paper? Developing a topic begins with feelings of doubt and uncertainty. Students begin their search for information; dealing with the new information they find often leads to more confusion and even a threat to their existing state of knowledge. Still lacking a focus, they may abandon the topic at this time or they may continue their search in the hopes of forming a focus. Again further information is required to test and assess the focus. Possibly the idea is rejected and once again a new topic is selected.

Figure 3

Model for Forming a Focus



Forming this personal focus takes time and does not come at the same stage for every student; it may never be formed for some (Kuhlthau, 1990). Changing topics may be necessary, a step which students and teachers may find hard to accept. Because of the anxiety and frustration involved, forming a focus is not an easy part of the research process and it is the one least understood by students, teachers and librarians. This stage is often

rushed or ignored; in fact, students may be forced into activities that actually impede the development of a focus.

The graduate student in my pilot study was asked to hand in an outline of his paper before he had developed a focus. Later, after a considerable amount of reflection, the student was able to narrow his topic. The student then spent futile hours trying to fit this focus into an obsolete outline. However, because his professor accepted a change in his topic outline, he was able to proceed successfully. This pilot study supported the findings of Kuhlthau's study of college students. They did not develop an outline for their papers until they were ready to write. Developing an outline came after the relevant information was read and the topic was narrowed.

The changing cognitive state of library users has been the focus of several studies. Taylor (1968) looked at the kinds of questions students asked reference librarians in an academic library. He saw many of these students trying to describe things that they knew little about. The library users' ability to talk about what they were seeking depended on their background knowledge and information. McFayden (1975) and Belkin, Brooks and Oddy (1982) expanded Taylor's work and were able to identify types of questions users ask and confirmed that this depended on the level of the individuals' knowledge. Looking at the nature of the question that a users ask, librarians can assess the level of the users' present knowledge. Belkin (1980) and McFayden (1975) viewed users in the research process as moving from a state where they could not define their problem to a well defined definition of their search. The more knowledgeable the users were about the topic, the more they were able to define their search.

This research helps teachers and teacher-librarians understand the kinds of questions students will have when beginning a library research project, as well as their inability at times to articulate what it is that they need. Background reading and knowledge is needed before a researcher can begin to narrow a topic. Students need time to relax,

read, and reflect in the early stages of the research process, especially at the exploring information stage (Kuhlthau, 1985a).

The research process requires that students make decisions and solve problems. What skills do students need to be successful at problem solving? Gagne (1975) discussed three kinds of learner capabilities that are involved when solving a new problem. These are: (1) intellectual skills, (2) organized verbal information, and (3) cognitive strategies.

The intellectual skills are the rules, principles and concepts that lead to higher order rules necessary in problem solving. The higher order rules are built over time from previously learned concepts and rules. These background concepts are needed when confronted with a novel problem. According to Kelly's theory, these are the constructs the student has from prior experiences.

Secondly the learner must be able to relate the components of the problem to a more general concept. He must be able to map the problem into something known. Knowledgeable students have a variety of schemata; they try one approach and if that doesn't work, they try another. This is similar to forming a focus in Kuhlthau's model or testing of new constructs in Kelly's theory. Somehow the learner must form a meaningful connection between the problem and his background knowledge.

Lastly the learner must have cognitive strategies to select the necessary information and skills and to decide when and how to use them in solving the problem. These strategies are not subject specific but are applicable to many different kinds of problems and can be taught in many different subjects.

This review of the literature briefly explains how students experience the pre-focus stages in the research process. Learning theories explain why coming to a focus takes time and why it is accompanied with a wide range of feelings. "For information to become personal knowledge, students have to make connections and see relationships between what they read, see or hear and what they know" (Alberta Education, 1990a, p. vii). Time

therefore is essential for students to gather and comprehend background information on a topic. Obvious from the field of problem solving is why the learner needs background information as new experiences must be linked with prior knowledge. These links come with increased experience and knowledge of the area being researched. The pre-focus stages of the research process have only been recently recognized and given attention. They deserve still further understanding and research.

Cognitive Development of Adolescents

Kuhlthau's studies centered on high school, university, and adult learners. How might junior high school students differ in their learning styles and cognitive processes? Different information processing skills at this age may result in ranges of feelings and abilities that would affect how a junior high school student would experience the research process. To address cognitive development a brief review of Piaget's theory will be next examined.

Piaget, a developmental psychologist, theorized that children move through stages of thinking as a result of assimilating and accommodating to the environment. Piaget divided cognitive development into four stages: sensorimotor, preoperational, concrete operational and formal operational. Piaget has suggested maturational ages for each cognitive period. The cognitive processes at each stage are described briefly below (Muuss, 1988).

Infants from birth to about age two learn through sensory-motor activities such as picking up objects, blowing, falling and making connections with the physical world and the objects around them. Children from ages two to about seven years move into the preoperational stage. This is the period when children learn language and begin imitating the objects and events they encounter. Children at this age are egocentric and tend to focus

their attention on one detail. They may be unable to shift to other aspects of a situation (Muuss, 1988).

During the concrete operational stage, when children are about seven to eleven or twelve, they begin to reason logically at a concrete level. Children at this stage are able to make rules and associations with concrete elements such as objects and relations. They can reason about things with which they have direct, personal experience. They have difficulty with hypothetical or abstract thoughts.

Piaget divided the stage of formal operation into two sub stages, almost full formal function (ages eleven to fifteen) and full formal function (ages fourteen or fifteen and up). During the almost full formal stage adolescents learn to handle increasingly complex problems. Their approaches to problem solving activities are still crude; they have difficulty planning investigations systematically. Once adolescents move into the full formal function they are able to form more elegant generalizations and laws, and are more systematic in their proofs (Muuss, 1988).

Adolescents that are the same age are not all the same stage of development. Students in junior high school range in cognitive development from concrete operational to full formal function levels in the formal operational stage. Full attainment of formal thinking depends upon the students' environments. A stifling environment may result in a delay of formal operational thinking, and in extremely disadvantaged conditions, individuals may never develop to this stage. Although a stimulating environment can promote full formal functioning, cognitive development is influenced by the maturation of the nervous system. Therefore, even when abstract thinking is encouraged in school, some students may not be developmentally ready for this stage (Muuss, 1988). The wide range of cognitive abilities makes instruction for students at the junior high age a considerable challenge. The levels at which students can complete research papers, the topics which they choose and the approaches they take completing a project, will also vary.

Changing cognitive abilities affect how young adults behave and think about the world they live in. Adolescents tend to be critical of adults and society. They are beginning to grasp what is and what might be and realize that the actual is less than the ideal. This inner turmoil is combined with a preoccupation with themselves and their thoughts. Since they have the ability to think about their own thoughts they are egocentric and introspective. Paradoxically they may feel that everyone is looking at them while at the same time feeling that they are totally alone. This self-consciousness can impede their performance at completing a task when there is audience pressure (Tice, Buder & Baumeister, 1985). Although adolescents are capable of creative thinking, because they are under tremendous pressure to conform by peers and society, they appear to lack creativity. Adolescents who rate highest in self trust and who believe in themselves are more willing to risk doing imaginative and creative activities (Earl, 1987).

Even though adolescents are developing higher cognitive thinking abilities, they can appear to be illogical because they still lack experience. They have a tendency to approach problems at a much too complex level and fail. They have the capacity to consider alternatives; however, the new capacity is not fully under control and they are not systematic in their problem solving approaches. Motivation can prevent adolescents from displaying full cognitive thinking. Fatigue and boredom may affect motivation and thus cognitive growth (Rice, 1990).

Piaget's theory of cognitive development reminds us that students in junior high school are not at the same level. Because adolescents are developing cognitively, this affects the way they view the world and themselves. They can be critical of others and appear to lack resourcefulness. They are egocentric and very self-conscious. They are under tremendous pressure to conform and therefore appear to lack creativity. What can junior high school teachers do to promote thinking and problem solving that will accommodate various levels of cognitive development? The review of the literature on

learning styles and thinking skills provides some approaches that may help address this question.

Developing Self-regulated Learners

Even though children progress through stages of cognitive development, the learning style of the student is relatively consistent (Kuhlthau, 1987c). When planning instructional programs to meet individual difference teachers should attempt to provide for the developmental level of the adolescent as well as for variations in learning styles. Measures for the various theories of learning styles present dichotomous scales of how a learner thinks and works best. Most individuals, however, fall somewhere on the continuum between the opposite poles (Kuhlthau, 1987c). Therefore, for more productive learning, a teacher should not overuse any one style. An understanding of the research in learning styles can help teachers address the individual differences of junior high school level students.

A complete examination of learning styles is not the intention of this study; however, an overview of the research in this field can provide an understanding of student individual differences and how to provide instruction to accommodate for these differences.

Pask (1976) stated that students may approach learning from two different ways, comprehensive learning or operational learning. In comprehensive learning, the learner focuses on an entire area being learned and then seeks interconnections between parts and the whole. This strategy for learning looks at the overall picture first before filling in the details of the separate parts. Overuse or misuse of this approach can result in making generalizations from insufficient evidence. Opposite to comprehensive learning is operational learning This strategy for learning involves a step-by-step approach where the learner pays attention to the separate parts that make up the whole. Overuse of this

approach may result in the learner not being able to relate parts of the whole. Teachers need to be aware of the strengths as well as the misuses of both approaches when using either strategy for learning.

Three major orientations to learning situations, which involve the source of motivation, have been identified by Entwistle (1981). These orientations are meaning, reproducing and achieving. Students who seek meaning when learning are intrinsically motivated. They are interested in what is being learned. They seek personal meaning by relating new information to existing knowledge. Students with a reproducing orientation to learning are extrinsically motivated. They fear failure and have a need for qualification and success. Their strategy for learning is to memorize their material. The achieving learners approach learning as a competitive game. They organize their work, meet all the required deadlines and play to win. Learning with a meaning orientation, where students are intrinsically motivated, leads to deep level processing. Reproducing and achieving orientations to learning result in shallow level processing. To encourage students to process information at a deep level, teachers need to help students to make the connections between new information and existing knowledge and to seek personal meaning in their learning.

The Gregorc learning styles scale divides learners into four categories based on how learners prefer to process information. The four measures on the scale are concrete sequential, concrete random. abstract sequential, and abstract random. Concrete learners prefer to work with hands-on experiences. Some concrete learners prefer information in a step-by-step way (concrete sequential) while others prefer to make intuitive leaps (concrete random). Abstract learners prefer symbolic information to direct experience. If they prefer information presented in a logical sequence they are considered abstract sequential while if they prefer less structure they are thought to be abstract random (Kuhlthau, 1987c). Teachers need to provide for a variety of methods of instruction and experiences to allow

for the different ways learners prefer to process information. Always using one approach will put students who process information differently at a disadvantage.

Studies have shown that children become more reflective as they grow older (Kagan, 1976). Impulsive children are fast and inaccurate in their information processes while reflective children are slower and more accurate in their processing. Reflective children are more concerned with error and get better grades in school (Kagan, 1976).

Sensory modalities preferences is another area that has been researched in the field of learning styles. Individuals differ in their reliance on kinesthetic, visual, or auditory modalities for learning (Barbe & Milone, 1981). Although modality preference can change with age, there is usually a distinct individual preference for one or more modalities in which information is presented. Younger children learn better with visual and kinesthetic presentations while older children can learn to prefer auditory learning situations. Similar concepts therefore need to be presented in a variety of modalities to accommodate for the range of student learning preferences.

Although there are many other aspects of learning styles beyond those covered in this paper, an understanding of the general principles in this field will help us see patterns in the way our students behave and learn. This then can help us in our lesson planning to accommodate for individual differences. Certain strategies have been found to be more successful in helping students learn than others.

> Learning styles which promote deep thinking rather than shallow-level processing are more productive in learning. Children who are more reflective than impulsive in solving problems are successful in school. An environment which helps students to seek meaning and relate new information to past personal experience encourages intrinsic motivation. Instruction which helps students to make connections and to integrate learning into meaningful whole promotes deep processing. . . . In light of what we know about learning styles, identifying a personal information need is essential for deep-level processing to take place. (Kuhlthau, 1987b, p. 291)

To understand how to help our students become more reflective and to encourage intrinsic deep level processing, the research in the area of critical thinking and metacognition needs to be considered.

Much research has currently been done on teaching thinking and metacognitive skills and strategies. Alberta Education has recently published a document on this subject, Teaching Thinking (1990), that recommends teaching of thinking skills in all grades and across all areas of the curricula. Students have the moral right to be taught how to think critically (Norris, 1985). With the rapid advances of information and technology, students will need to be critical and creative in their thinking and be able to problem solve in the complex world that will face them. As teaching shifts from dispensing knowledge to facilitating learning, students will become more autonomous in the learning process (Mancall, Aaron, & Walker, 1986).

How then do teachers plan to include thinking in their classrooms? No one model will suit all learners and all subject areas so each teachers must individually make their own program. Some considerations when developing a program are: make it developmentally appropriate, include metacognitive strategies, make it motivational and interesting for students at the desired age, make it adaptable to individual differences and provide ways for evaluating student progress (Alberta Education, 1990). Before looking at what the implications this has for school library programs at the junior high school, an understanding of metacognition is required.

"Metacognition is the essence of thinking, learning and doing. It is the performer spirit in action" (Alberta Education, 1990. p. 43). Metacognition is thinking about thinking. Metacognitive students know about how they learn and think and they understand their strengths and weaknesses. They know how to be independent learners and how to transfer their knowledge of themselves to any learning situation. What

conditions are needed for self-regulated learning and how then do we as teachers promote autonomous learning in our classrooms?

Self-regulated learning is based on a cognitive constructivist theory. This view of learning sees the learner as an active being trying to impose order to his or her world. Other theories of learning view the learner as being a passive being, copying the structure of the world or having innate categories of knowing. Unlike these other theories, constructivists see the learner actively involved in making sense of experiences to generalize to new settings and new experiences. Since every person has had different experiences, each person will bring a unique view to new learning situations. Constructivists view learning not as a passive activity but one that must involve the learner. Kelly's Personal Construct Theory, discussed previously, viewed the learner as an active being when in the process of assimilating new experiences. It was emphasized when reviewing Kelly's theory that the process of construction takes time and involves both the emotion and the intellect of the learner.

The learner's experiences are stored as mental representations which change with cognitive development. These representations range from the concrete in early cognitive stages to symbolic in the formal operational stage. The learner's understanding of the world is never final and is constantly balancing between current knowledge and new inputs. To make learning experiences most productive these experiences must be based on maturational levels as well as on previous knowledge and experiences. Vygotsky's theory of the "zone of proximal development" states that instruction is best just beyond what the child already knows but not so far that the child cannot learn without some guidance. The development of reflection and reconstruction leads to autonomous self-regulated learning which becomes progressively better and more organized as the child matures (Paris and Byrnes, 1989). For information to become personal knowledge, students need to learn a

"comprehensive research process" that can be applied not only in school but in real life situations (Alberta Education, 1990a, p. vii).

How would you describe self-regulated learners? Autonomous learners are motivated and active in the learning process. They show signs of metacognition in that they plan, organize, self-instruct and self-evaluate their learning. They are intrinsically motivated and can create social and physical environments to optimize their learning (Zimmerman & Schunk, 1989). Self-regulated learners are good strategy users. They possess many strategies and know how, when and where to apply these strategies. They have a good knowledge base and have positive perceptions of their own competencies. They are optimistic learners, they set goals, and they attribute success to effort and investment of energy. They are task-involved, deriving a sense of satisfaction and pride in their learning. They continue to practice and automize their use of strategies to new learning situations (Harris & Pressley, 1991).

Zimmerman & Schunk (1989) interviewed 40 high achieving students and 40 lower achieving students in a middle class high school. These students averaged age 15. The researchers asked questions concerning student use of self-regulated learning strategies during class. It was found that high achieving students displayed significantly greater use of self-regulated learning and less use of one single strategy. The use of self-regulated learning measures proved to be the best predictor of high achievement test scores on standardized tests. High achievers were also distinguished by their use of teachers and peers as sources of social support. They were reported to seek assistance from adults more often, usually parents, to accomplish academic tasks.

Other studies have shown increased results when teaching learning disabled students metacognition and strategy processing. These students gained more knowledge about strategies and learned more self-control as when to implement these strategies. They began to understand the need for effort and persistence for successful performance. They

learned that the payoffs were worth the effort (Borkowski, Estrada, Milstead & Hale, 1989).

Positive self-esteem appears to make a difference between students who display self-regulated learning and those that do not. By early adolescence children recognize their talents and weaknesses. They have a strong preference for investing their effort when it is least risky or threatening to their self-esteem. Up until age seven or eight children have an exaggerated view of their abilities. However, by about ten most children begin to distinguish between effort and ability and view greater effort as a sign of low ability. Success with high effort is less valued than effortless success. Failure with effort is a devastating indication of low ability. McCombs (1989) feels that students have an inherent tendency to learn and develop and that autonomous learning is to further motivate student's natural tendencies. It appears that the students' global self-worth predicts emotional experiences that affect their motivation and behaviors. Students need not only to be taught metacognitive strategies; they also need to experience success when using them in order to see value in themselves and what they are learning.

In addition to providing successful experiences for our students, we need to teach children to cope with failure. Self-regulated learners have the skills and desire to combat boredom and frustration while students who have maladaptive reactions to failure will become hostile, withdrawn, become apathetic or depressed. We need to teach our children that failure can help to refine and develop self-regulating learning. "Chronic success and mindless failure are to be avoided in the classroom because neither provides the opportunities for students to develop effective coping strategies" (Paris & Byrnes, 1989, p. 193).

How can instruction foster self-regulated learning? One approach to promoting autonomous learning is to directly instruct and explain learning strategies. Positive results of such instruction has been seen here in Alberta with the SPELT program (strategy

program for effective learning/thinking). Mulcahy (1991) recommends that teachers model as well as directly teach these strategies. Peer tutoring and dialogues about learning are other methods that promote metacognition and self-regulated learning. These methods help students to construct more articulate and organized theories of their learning. Cooperative learning has demonstrated that students who work cooperatively show increases in their academic learning strategies. Students get a chance to question their own views as well as those of their peers. Any instructional technique that emphasizes that learners actively seek and organize data relevant to their own experiences encourages students to develop strategies and metacognition that will enhance self-regulated learning (Paris & Byrnes, 1989).

If the library program is to assist in the educational programming for the school it must play a role in teaching students to think and learn. Integrating library research into classroom activities expands the boundaries of learning and provides opportunities for critical thinking and problem solving. However, if instruction is to be effective students most be developmentally ready to learn the skills and must see the activity as being useful (Mancall, Aaron & Walker, 1986). Therefore, a continuum of library and thinking skills and strategies must be built into every school program that is developmentally based. One guide for developing a research taxonomy can be found in Preparing Students for Information Literacy (Eshpeter & Gray, 1989). This guide gives possibilities for extending student research beyond the basic report of recording and reiteration of data. The three levels of research are addressed in this guide: the basic report, issue-based reporting and thesis-based reporting. A continuum of thinking skills involved in the research process can be helpful when programming for individual differences, given that junior high school students range greatly in abilities and library experience. Our focus must go beyond where to locate information and finding the correct answers to developing insight into the way we think and learn.

Besides individual differences in cognitive development, adolescents differ in the way they prefer to learn. Therefore teachers must use versatile instructional presentations and provide varied learning opportunities. Teachers and students both need to learn more about how to analyze their own thinking. Metacognitive skills and strategies must be developed through our teaching and learning programs. Teachers and students need to be constantly reflecting on their progress. If the library program is to contribute to the educational needs of the students, it must not only provide for different cognitive levels and learning styles but also provide thoughtful research experiences that stimulate thinking.

Summary

What does the research tell us about how adolescents will experience and work through the research process? What does this suggest about the way we teach the research process? From Kuhlthau's extensive work with young adult and adult learners, it has been discovered that forming a focus is the most difficult stage in the research process. Kuhlthau recommends that teachers instruct their students at this stage to relax, read and reflect. From the additional research explored in this paper, why then is this an excellent suggestion?

Students when completing a research assignment are often confused and upset, even at the high school and college level. Therefore, students need to be encouraged to relax when reading in order to form a personal focus. As students at the junior high school age are not systematic in their approaches, they may need to be taught strategies on how to skim and organize their work. Students at this age are also at varying cognitive levels and therefore will range in their choices of topics and their ability to read, comprehend and form a focus. Learning styles stress the importance of offering information in different modalities as well as accepting final products in varying forms. Students at the junior high

school age are under tremendous pressure to conform and may not want to appear interested or creative. Their changing cognitive state and how this affects behavior must also be taken into consideration when preparing for a research project with junior high school students.

Reading is imperative for the student to gain background information needed to link the problem to something known. Both learning theories and problem solving theories stress the importance for the learner to make connections and personalize information in order to reconstruct new information and make sense of novel experiences.

Reflection is a key component in the research process. It enables students to think about their successes and failures. It helps students learn about how they individually work best and how to optimize learning in the next situation. These skills are necessary for life-long learning. The greatest inventions and discoveries were not accomplished at the first attempt but were achieved through hard work and analysis of what worked and what did not. Teachers must stress to their students the learning that comes through failure, yet balance it with successes for all students. Self-esteem is a key link to self-regulated learning. If we encourage our students to believe in themselves and their abilities, then we will have a greater chance of successful learning in our classrooms.

CHAPTER THREE

Methodology

Introduction

Teachers are confronted daily with questions and concerns about their school environment, students, parents, administration, curricula and the community. When teachers actively explore better ways to answer these questions, teachers are involved in research. For example, when new students are having problems in classroom, the teacher refers to the students' cumulative records or calls the students' former teacher to gain more insight into the situation. Teachers engage in research as part of their daily lived experiences on the job.

Action research is a process through which educators work together to improve education by change through reflection on their daily teaching habits. Action research is:

> . . . a form of collective self-reflective inquiry undertaken by participants in social situation in order to improve the rationality and justice of their own social and educational practices and the situation in which practices are carried out. (Kemmis & McTaggart, 1988)

Action research combines action and research. It is a very practical as its purpose is to better understand the real problems that exist in our schools. Action research is collaborative, therefore, it empowers educators to resolve their own concerns. It is fair, democratic system that requires a never ending systematic learning process. Those educators that have been involved in action research project speak highly of the experience (Carson, Connors, Ripley & Smits, 1989)

Because this study involved the collaborative effort of five teachers reflecting on their teaching practices, an action research approach was taken. The purpose of this study

was to gain a better understanding of how junior high school students work through the research process. In order to interpret the research procedures used in this case study, an understanding of the action research process is required.

Stages in Action Research

There are three stages in action research: (1) recognizing a question of practice, (2) reconnaissance, and (3) action research cycles. Each stage will be explained briefly to further clarify the process of action research.

Stage 1: Recognizing a Question of Practice

The first step in the action research process is to identify one concern related to the teachers' daily practice. This can be difficult, considering the many concerns and problems educators are confronted with. An action planner, called a table of inventions, has been developed by Kemmis and McTaggart (1988) to assist teachers to focus on a possible question. The table of inventions is divided into 16 cells from A1 to D4 (Table 2). The four commonalties of education that create the table are teachers, students, subject matter and milieux. Milieux refers to the contexts of education, such as the classroom, school community or society. The researchers proceed through each cell in the table asking themselves questions about each relationship. For example, in cell A1 the teachers may ask what is the relationship in the school between teachers in the school and the students. As the researchers work through the table, recurring themes may arise that will help the researchers in selecting an action research project. Once a theme is chosen, the researchers may then ask more probing questions about that theme, going through the table of inventions a second or third time.

Table 2

Table of Invention

	A. teachers	B. students	C. subject matter	D. milieux
1. teachers	A1	B1	C1	D1
2. students	A2	B2	C2	D2
3. subject-matter	A3	B3	C3	D3
4. milieux	A4	B4	C4	D4

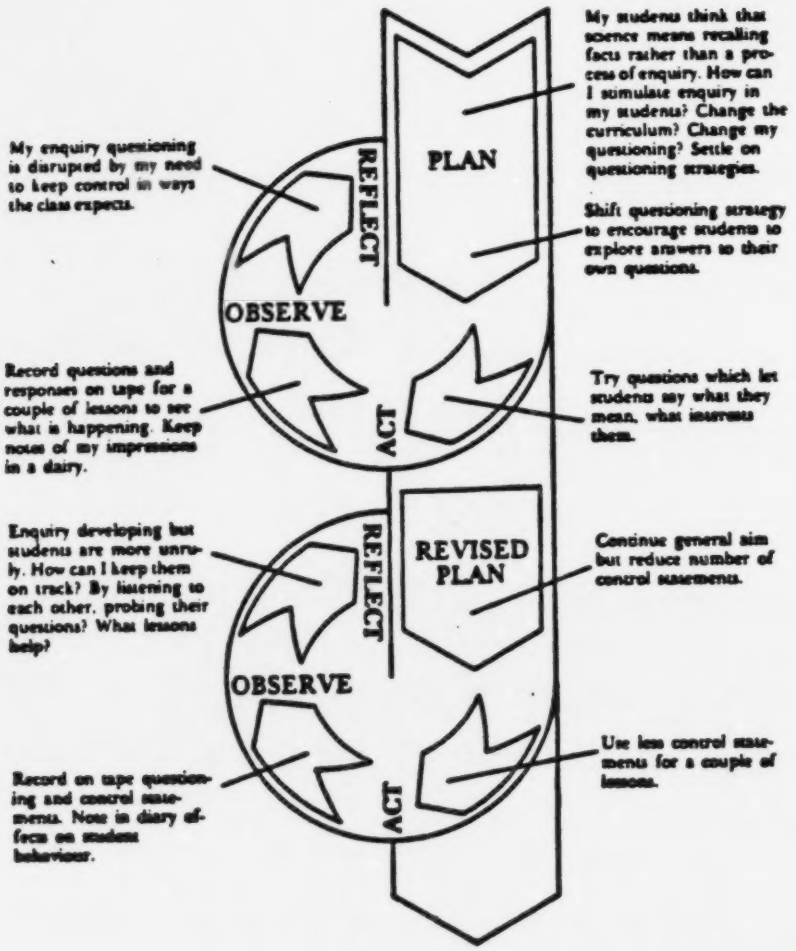
Note. From The action research planner (p. 93) by S. Kemmis and R. McTaggart (Eds.), 1988, Victoria: Deakin University. Copyright 1988 by Deakin University. Reprinted by permission.

Stage 2: Reconnaissance

Once a theme has emerged and a specific question agreed upon, the next stage in the action research project is to look at the present situation of the school and identify who will be involved and what resources will be needed. This reconnaissance stage is necessary because the project is to be a collaborative effort of all individuals involved. It is not a passive observation of events or a project imposed by others; therefore, all those involved must assess the existing situation at the school and determine the time, resources and personnel needed for the project and who will be affected as a result of the project.

Figure 4

The Action Research Spiral


My students think that science means recalling facts rather than a process of enquiry. How can I stimulate enquiry in my students? Change the curriculum? Change my questioning? Settle on questioning strategies.
PLAN
My enquiry questioning is disrupted by my need to keep control in ways the class expects.
REFLECT
Shift questioning strategy to encourage students to explore answers to their own questions.
OBSERVE
Record questions and responses on tape for a couple of lessons to see what is happening. Keep notes of my impressions in a diary.
ACT
Try questions which let students say what they mean, what interests them.
Enquiry developing but students are more unruly. How can I keep them on track? By listening to each other, probing their questions? What lessons help?
REFLECT
REVISED PLAN
Continue general aim but reduce number of control statements.
OBSERVE
Record on tape questioning and control statements. Note in diary effects on student behaviour.
ACT
Use less control statements for a couple of lessons.

Note. From The action research planner (p. 14) by S. Kemmis and R. McTaggart (Eds.), 1988, Victoria: Deakin University. Copyright 1988 by Deakin University. Reprinted by permission.

Stage 3: Action Research Cycles

Each action research cycle involves four steps: planning, acting, observing and reflecting (Figure 4). During planning, all participants discuss the question to be addressed. They then implement a plan of how they would like to resolve the problem.

Writing a formal plan for the action research process helps formulate thoughts. This plan should outline the specific change that the researchers want to make. The initial action step should be identified and the methods that will be used to observe and record the result of the first action step noted. A timeline for the first cycle should be determined. The researchers then observe and collect data for further reflection and action. During reflection, the participants discuss their observations of the action and develop revised action plans based on what they have learned from planning, acting, observing and reflecting. The revised plan can raise new questions or delve deeper into the area the researchers are exploring. This continual process when diagrammed looks like a spiral. Unlike problem solving models, the action research model never ends. The second and subsequent cycles of planning, acting and observing will be based on the reflection of the previous cycle.

Sample Selection

The researcher cooperatively planned and taught a library research project with three other teachers and the school's teacher-librarian in a large junior high school using an action research approach (Kemmis & McTaggart, 1988; Carson, Connors, Ripley and Smits, 1989). Two classes of grade seven and two classes of grade eight students were involved in this study. As participants, the action research team worked daily with the students on their library research projects over a period of three months.

Data Collection

Many kinds of data were collected in relation to the students' experience of the library research process: surveys, perception questionnaires, flowcharts, final evaluation forms, response journal and essays.

Students were asked to fill out three surveys at the initiation, midpoint and completion of their research projects. As well students filled out a perception questionnaire and a flowchart at initiation and completion. A final evaluation form was filled out when students were finished their library research projects. The surveys, questionnaires, flowcharts and evaluation forms were taken from Kuhlthau's (1988b) study of high school and university students. A sample of the survey, questionnaire, flow chart and evaluation form is included in Appendix 2. The students also kept response journals recording their feelings and activities. Student essays were collected and assessed in order to determine if students had reached a focus in their papers.

The action research plans developed by the action research team provided additional information. The action research team gathered data through seven cycles of planning, observing, acting and reflecting. The action research team focused on how students worked through the research project and, in particular, how and when they limited their topics. The researcher also recorded these plans, observations, actions and reflection in a daily journal.

Data Analysis

Through the action research cycles of plan, observe, act and reflect, the action reassert team interpreted the data provided in the surveys, perception questionnaires, flowcharts, evaluation forms, response journals and essays, in order to arrive at the

general themes that emerged from these findings. These general themes were discussed and presented to other teachers at a staff meeting. A summary was published in the school newsletter that went home to the students' parents.

In addition, the researcher continued to analyze the surveys, perception questionnaires, flowcharts, evaluation forms, response journals and essays on her own, using the content analysis approach outlined by Berg (1989). Data analysis began with an immersion in the data and the interpretation of the themes was discussed with the thesis advisor.

Ethical Considerations

The surveys, perception questionnaires, flowcharts, evaluation forms, response journals, essays and teacher observations had no potential for producing physical or mental harm to the participants. Participants and their parents were informed as to the purpose and the use of the data obtained. Participation in the study was voluntary. Participants were guaranteed anonymity and their individual responses are available to no one other than the researcher and the thesis advisor. A sample information letter and consent form are provided in Appendix 3. The general findings of the study were disseminated through the school newsletter so parents and students were given the overall results. More specific details of the study are recorded in this thesis paper.

CHAPTER FOUR

Action Research Case Study

Introduction

Action research is very systematic in its approach to "on-the-job research". It involves many preliminary conditions as well as planned action steps. Researchers must first discuss their concerns, the nature of the educational improvement proposed and the context of the project before any action steps can be planned and taken. Three stages are involved in an action research project: (1) recognizing a question of practice, (2) reconnaissance, and (3) action research cycles. How the action research team worked through each of these stages is described below.

Stage 1: Recognizing a Question of Practice

At a professional development day in May of 1990, the science department met to discuss and evaluate its instructional practices. We felt that we, as science teachers, did too much direct teaching and relied mostly on the textbook as the only source of information. We were also concerned with the learning practices of our students. We felt that our students were too passive and were not taking control of their own learning. Our desire was to engage students in active inquiry in science and to facilitate their development as autonomous learners. We planned to accomplish this by involving students in a library research project in conjunction with a science project the following school year. Our primary goal then was to gain an understanding of how to help students learn the research process.

Current studies on the research process indicate that students have difficulty coming to a focus or narrowing their topics (Kuhlthau, 1987a). However, to date all studies have centered on high school and university students. We wanted to see how junior high school students would experience this process and how we could improve our teaching practices to guide our students through this process. We expected that the pre-focus stages of the research process would be the most difficult and accordingly we planned to spend more time working through and teaching the skills and thinking processes for these stages. We planned to meet again in September to discuss and make more detailed plans and to involve the school's teacher-librarian.

Stage 2: Reconnaissance

This junior high school, situated in an urban setting, houses 500 students from grades seven to nine. Students are from a middle-class socioeconomic background. The school offers many programs ranging from the adaptation-learning assistance program to the gifted and academic challenge program. The teachers are mostly middle-aged; there are only a few younger members on staff. Generally the staff is quite conservative and tends to teach using a lecture style. Students are well behaved in this school and there is a positive staff morale.

The library in this school is undergoing many changes. In the past, the school was in a deficit financing situation resulting in many cutbacks. Now out of debt, the school has more money for programs. The parent committee raised $15 000 to upgrade and automate the library. At the time of this study, the teacher-librarian had developed a research skills unit for grade seven and was eager to expand research into all grades and across all curricular areas. The collaborative effort of those involved in the action research project was the result of the science department's desire to reevaluate its instructional practices and

the school's new direction in regards to library research. The four science teachers and the teacher-librarian agreed to work together on a library research project in conjunction with a science project that would involve students in grades seven and eight.

In September of 1990, the science department and the school's teacher-librarian met to discuss plans for the science project. We planned to start this project in February 1991. The project was planned in the context of a science unit developed the previous year. We planned to meet again in January 1991 to review the implementation of this library research project and science project. As a science teacher and former teacher-librarian I volunteered to cooperatively plan and teach this unit with the other science teachers and the school's teacher-librarian.

The details of the library research project and science project were carefully worked out in January 1991. Students would research a particular topic of their own choosing, develop a model or experiment and present their findings to the class. The library research essays were included in this science project as a means of helping students to develop their understanding of their selected topics. Students were then to take this information and display and present their findings. These findings could be presented in one of four ways. One method would be to make a display of information already available. Adding to this display, students could include charts, illustrations, a model, a collection or a specimen based on the student's investigation. Thirdly, students could develop working models based on an understanding of a scientific principle. Lastly, students could attempt to answer a question by an experiment. The methods of presenting scientific information would be carefully explained to the students. This science project would be assigned 200 marks; 100 for the essay component and 100 for the display and presentation. Each exercise and skill would be marked as each step in the process is important for students to learn to be successful at researching. The components of the written essay part of the project would include a research plan, a note taking exercise, response journals, limiting the topic exercises, notes, categorization of notes, the rough draft, editing and good draft.

The display and presentation would broken down into three categories: the display and backboard, the presentation and speech to the class and students' summaries and evaluations of each others' projects. The breakdown of marks would be given to the students at the beginning of the research assignment and stapled to students' individual file folders (see Appendix 4). As each aspect of the library research project was completed and marked it would be kept in the folder in the classroom for safe keeping to be used at another stage in the project. Junior high school students, although independent and capable, have a hard time holding on to individual sheets. This structured approach would help students stay organized.

While we worked through the research process in steps, students would be asked to complete three surveys: one at the initiation of the written essay component of the project, another at the midpoint of the essay and the last at the completion of the essay. As well, at the initiation and completion of the essay, students would fill out a perception questionnaire and a flow chart. The flow chart required students to indicate the steps in a library search that they could envision themselves taking from the initiation of the project to the completion of the information search.

Daily response journals would be kept and the researcher would respond to the students' concerns and questions on a weekly basis. Students would not only record their feelings and dilemmas, but account daily the steps they were taking and plans they were making during the research process. When the essays were completed students would fill out a final evaluation form, assessing how they felt they worked through the process and how they would work differently on the next research paper.

Data would be collected and reviewed by the action research team. We planned to met on regular basis to review what each of us observed while the students worked through the science project. This information, from the data and teacher observations, would provide insight to what lessons needed to be reviewed and how the students were

progressing. This information would form the bases of each action cycle. The details of these cycles will be briefly explained next.

Stage 3: Action Research Cycles

Seven action research cycles of plan, act, observe and reflect were implemented in this action research project. Outcomes from this action research project formed the bases for a second phase in the project proposed for the following school year.

Cycle 1: Receive Assignment and Topic Selection: Week 1

We began our research project in February and outlined the process and plans with our students. Students were given a booklet including the marking scheme, goals of the project, ways of presenting science information, how to construct the exhibit and how to develop an oral presentation. Also, a timeline of the library research process, a response journal and an individual file folder were given to each student. This information outlined for students the stages they would go through when researching a library essay and the expectations for the science project.

We started with a webbing exercise for topic selection. Students filled out a survey and in their response journals described for us their background in completing library research projects. At our first teacher conference we noted from these journals and surveys that students in grade seven had a limited background in science and that most students wanted to study topics that were related to their pets and other animals. We decided to change our student expectations for this project. Students with such limited background and experience in research would not be able to complete papers involving hypothesis and

experimental research. Therefore, we decided to accept fact finding projects but encourage higher level research project including issue-based and thesis-based reporting.

Cycle 2: Select Topic and Explore for Focus: Week 2

Students appeared to be having difficulty with their webbing exercise in that the webs included topics that were very general. For example one student decided to investigate water. He wanted to look at all aspects of water; its uses, related problems and future concerns. We decided to get students to develop three to four questions about their general topic to narrow down their topic. These new webs and questions were then handed in. Again we noted that the student's webs were very general. From student diary entries we noted that students were frustrated with this exercise and they were still unable to narrow their topics. I had one student ask me to give him a topic as he just could not come up with one on his own. Kuhlthau's (1987a) studies indicated that forming a focus would be the most difficult stage in the research process so we were not surprised by this. We decided to have students relax, read and reflect at this stage (Kuhlthau, 1989a). We needed to back up and try a new plan.

Cycle 3: Exploring for focus: Week 3

We felt that students were having trouble coming to a focus because they did not have sufficient background knowledge on their general topics. It is difficult to generate questions about something you know very little about. We therefore decided to have students explore more about their general topics by reading a short related article in an encyclopedia. We then asked students to generate a few facts that they learned about their topic and questions that they still needed to investigate further. This exercise was intended

to help students form three to four questions that they could focus on in their research. Students handed in this third exercise and we teachers discussed our frustrations. One frustration centered on the difficulty of getting junior high school students to read. Many of the students could not settle down to read their articles and spent most of their time talking with their friends. We decided to brainstorm for ways to use the student's obvious need to talk.

Cycle 4: Explore for focus and form focus: Week 4

The encyclopedia exercise was attempted again but this time we had students read only for 15 minutes. Students were then asked to team up with a friend to talk about what they read on their topics and together generate three to four questions. This exercise was then handed in and students were asked to record in their journals how they felt about where they were in the process and how they felt about their topic. Most students indicated that they were feeling relieved at being successful in narrowing the topic and having reached a focus. After four weeks we now felt that most students in grade eight had a focus. However, many of the grade sevens were still experiencing difficulty.

Cycle 5: Collecting Information: Weeks 5 & 6

We now wanted students to use their generated questions from the webbing and discussion exercises to take notes from information sources. The three to four questions that were generated could be used as key headings helping students organize and categorize their notes. Also at this point many students were asking questions about where to get resources. We needed to teach students how to use the card catalogue, periodical indexes and vertical file guides. Most students did not know how to gain access to information in

our library or know where they could find resources from other places. We therefore brainstormed for places to get information. As well, we reviewed how to skim information, how to use a table of contents and glossary to find specific information.

When students finally handed in their notes we were reminded of another skill that needed more review and practice. Students needed another strategy for taking notes and organizing their work. Many students copied word for word from their sources and were not aware of the extent to which they were plagiarizing.

Cycle 6: Collect Information: Week 7

We questioned how we would deal with the problem of plagiarism. Although students were familiar with the concept, they believed by changing a few words in a sentence copied from a source, that they were then creating their own original work. We decided to have students put their notes on strips of paper in order to emphasize writing only key words and phrases. For some reason writing notes on strips meant students could not put down as much information and therefore did not copy complete sentences or paragraphs as they had done previously. From these strips we then showed the students how to categorize information using color coding and number coding. Students then resubmitted their work.

Cycle 7: Prepare to Present: Weeks 8-12

On the whole, most students now appeared to be on track and could begin to write their rough drafts. While we continued to teach the topic sentence and hints for paragraph writing, some grade seven students were still having trouble forming a focus and as a result were having trouble developing questions and organizing their information. We

conferenced with each student who was still experiencing difficulty in reaching a narrowed topic. It was necessary to have some students come in after school and lunch hours to work on their questions and note taking. Students that had difficulty reaching a focus needed individual instruction.

For the remaining three weeks students prepared their backboard displays, models, experiments and their oral presentations. Students not only listened to each others' presentations, but submitted a summary of the findings and an evaluation for each project. All student exhibits were displayed in the school gym at a open house during Education Week.

Moving Into a New Phase of the Action Research Project

At the completion of the total science project the action research team discussed the results and the concerns they had regarding how students worked through the research process. These outcomes are summarized into three categories: student results, teacher considerations and proposal to staff.

Student Results:

To our surprise, all 120 students handed in essays! The step by step monitoring really helped us keep track of students and their progress and to encourage and individually help those having difficulty. The monitoring of student progress and the constant discussion of our observations enabled us to rethink our methods of teaching and review how our students were learning. Having a teacher and a teacher-librarian work together with one class allowed us more time to confer with students, identify trouble spots and work with each student.

There was a big difference in the level of research between the grade seven and grade eight essays. On the whole the grade eight essays were more focused and organized. These grade seven students were not ready to complete essays with a free choice of topics. They needed more structure and time to complete their library research papers and science projects.

Teacher Considerations:

This action research project did not progress without tensions and dilemmas. We were very frustrated trying to get our students to narrow their topics. We spent four to five weeks and four cycles reworking our plans. Even after all our efforts we still had a number of grade seven students who were unable to come to a focus.

Time is a concern for our science teachers. We are still exploring ways to become more efficient. To make our library research and science project more practical it has to fit into the time constraints we are faced with, as we must cover other curricular skills and content.

We still need to spend more time thinking about how to work with children at this age and their obvious need to talk. How can we channel this in our plans rather than fight it? We felt we were partially successful but would like to improve in this area the next time we work on library research projects.

Proposal to Staff:

The action research team noted that there was a difference between the grade seven and grade eight library research projects in quality and in students' ability to come to a focus. To address this issue, plans for the next year were presented to the staff to

consider. A school continuum of research skills that progressed step by step, grade by grade was presented and explained. All teachers should be familiar with this plan, as library research projects are completed in most subjects in most grades.

To ensure that students were being taught the necessary skills and strategies, the school plan provided for one research project cooperatively planned and taught with the teacher-librarian. In grade seven students would complete a small research paper of one to two pages. Because students in grade seven have difficulty limiting a topic, limiting could be done for them. Then students could choose a topic from a list developed by the teacher. In grade eight the research paper can be longer, three to five pages allowing more freedom in the choice of topics. As well, the level of research would progress from fact finding in grade seven to hypothesis kinds of papers in grade nine. The staff considered the plan and decided that a draft plan would be developed from a committee of interested teachers the next year. This then will be another phase in the development of this action research project.

The action research team considered the possible difficulties of incorporating a research skills continuum in the school. With so many people involved, it would be difficult to monitor progress and make plans for new changes. The school's teacher-librarian is keen to cooperatively plan and work with all teachers next year, but she has limited time in the library and can not possibly complete an in depth study with all teachers. Our fear is that phase two could get lost involving the whole school. However, we feel the school must develop a research skills continuum, as teaching research skills and strategies are important in developing lifelong learners.

Personal Reflection of the Action Research Process

As a science teacher, I can relate action research to a scientific principle. Action research is similar to the moon's relationship to the cosmos. The moon rotates in epicycles around the earth as the entire solar system is shifting within an expanding universe. As the universe continues to unfold the moon continues to move into new phases. Similarly, action research proceeds in cycles of planning, observing and reflecting. Like the moon, we must continue to shift to new phases as we progress. Analogous to the expanding universe, action research is never ending and we can never feel that we have reached the end.

CHAPTER FIVE

Findings: Overall Results

Introduction

Do grade seven and grade eight students experience the same stages and associated feelings when researching as did the high school and university students in Kuhlthau's studies of the research process? Using Kuhlthau's survey, 36 grade seven students and 37 grade eight students were surveyed at the initiation, midpoint and completion of their library research projects. Students also filled out a perception questionnaire and a flow chart at the initiation and completion of the essay portion of the project. As well, students kept daily response journals of their feelings and thoughts throughout this process. A final evaluation form was completed by students after the research process had ended. Using the information from these sources the thoughts, feelings and steps students experienced at each stage in Kuhlthau's model will be examined next.

Grade Seven Projects

Two classes of grade seven students participated in library research projects. 36 out of 60 grade seven students returned consent forms and participated in this study. A variety of sources of information was used to gain an understanding of the emotional and intellectual states of grade seven students working through a library research project

Stage 1: Receive Assignment

Generally the students in grade seven were quite excited and confident about starting their research projects. Out of 36 students only eight (22%) rated their confidence level below five on a ten point scale. Some students that rated themselves above five on the confidence scale felt that the project "would help them" and indicated that they were looking forward to starting. Although most students were optimistic at this stage, many also revealed a mixture of other feelings such as uncertainty, doubtfulness and confusion.

Students were also given a perception questionnaire to complete. On the perception questionnaire students indicated how they preferred to work through a research project. Their responses indicate that students like to talk to others about their topics. They almost never ask the librarian for help when exploring ideas for a topic.

Students were required to reveal, by completing a flow chart, the steps that they could envision themselves proceeding through, from the initiation to the completion of their research projects. At initiation students' flow charts were very limited and did not contain many pre-focus steps, other than topic selection, nor did students include the forming of a focus stage or what commonly has been referred to as narrowing the topic (Figure 5). Most of the students' flow charts began with topic selection followed by collecting information. Generally student flowcharts showed two stages the collecting of information and the writing process (i.e. note taking, rough draft, good draft). The average number of stages that students included in their initial flow charts was seven at initiation (Figure 11). High achieving students had a clearer picture of the steps they would take while low achievers were generally not sure how they would proceed. Student achievement for this study was based on the students' final grades on their research essays. This rating was used to classify students as either high or low achievers.

Stage 2: Select Topic

Students were asked to keep a daily response journal of their feelings and thoughts throughout the research project. These journals were collected weekly to respond to student concerns, to give suggestions and to encourage student progress.

Students expressed feelings of frustration in their journals during the topic selection and focus stages. Here are a few quotes that typify student feelings: "It is very hard to decide what topic." "There are so many different topics to choose from in science." "I found getting a topic a little harder than being assigned a topic."

Many students commented in their journals that they had completed research reports in their elementary grades but mostly in social studies. Their topics had been given to them or they had chosen a topic from a list of recommendations. Generally topics grade seven students chose to research for this project were related to their pets and other animals. Students' struggle with topic selection and forming a focus was partly due to their limited background in science.

Stages 3 & 4: Explore for Focus and Form Focus

A midpoint survey was completed by students to assess their feelings and confidence levels and to indicate whether they had reached a focus. There was a drop in students' confidence rating from 6.9 to 6.3 (Figure 12). 19 out of the 37 (58%) students had a focus at this point. Students that had reached a focus rated themselves on the average at 6.8, while those that did not have a focus rated themselves on the average at 5.7 (Figure 13). This 11% difference indicates that students that were focused in their papers were more confident about themselves in the process.

It is interesting to note that few students reached a focus after the midpoint. At midpoint 58% of the students had reached a focus. At completion 60% of the students had narrowed their topics. This increase of 2% represents a change in only one student (Figure 6). Students who were not focused at the midpoint did not become focused in the collecting information and preparing to present stages of the process. It is evident how important it is that students reach a focus before proceeding to the next stages in the research process.

Stages 5 & 6: Collect Information and Prepare to Present

The completion survey showed that students were very relieved, satisfied and confident at the end of their assignments. They rated themselves on the average at 7.9 out of 10 (Figure 12). There were no ratings below four.

At completion 60% of the students had reached a focus in their papers while 40% did not (Figure 7). Focus was assessed by reading each student's paper and determining whether the student narrowed a topic to a few specific questions on one particular topic or whether the student wrote about the topic in general terms. For example, Sasha did reach a focus in her paper. She researched the positive and negative aspects of the bioremediation method used to clean up the Exxon Valdez oil spill. Von, who failed to come to a focus in his paper, chose to research water. He wrote about water in general terms, all the uses of water, the benefits of water, water pollution, and future concerns about water.

Students who did focus did much better on their essays receiving an average mark of 76%. Students who did not come to a focus in their papers did considerably poorer averaging 55.8% (Figure 14).

From initiation to completion, 67% of the students remained with their same general topic. Staying with their general topic did not seem to affect whether students narrowed their topic or achieved a higher grade on their essays. 22 students remained with the same topic and eight of these students (36.4%) did not reach a focus. Of the 11 students that did change their topic, four (36.4%) did not narrow their topic. Therefore changing or not changing a topic did not make a difference in the student coming to a focus for the research paper. There was a general reluctance for the grade seven students to change their topics once they had chosen a topic.

A second perception questionnaire and flow chart at completion was given to students in order to compare their initial impressions of how they would work through a research paper, to their final thoughts on the process. There was an increase on average of four steps in student flow charts, from seven steps to eleven (Figure 11). This time many students included limiting the topic and other pre-focus steps in their charts. Most of the students included the steps in the research process that they had been taught (Figures 5). Evident from this graph is the increase in the number of pre-focus steps students included from receiving the assignment to forming a focus. Students generally included one or two steps on their initial flow charts. This increased to three and four on the final flow charts. Students had become more aware of the research process. Overall from receiving the assignment to assignment completion, there was an average increase of four steps (Figure 11). In the pre-focus steps, there was an increase of two steps from receiving the assignment to forming a focus (Figure 5).

Stage 7: Assessing the Process

Students were given a final questionnaire to assess what they learned about themselves as learners and how they would proceed differently the next time they were involved in a research project. Many students commented that they would work harder at the beginning as they found themselves rushed towards the end. They stated that they had learned how to limit a topic and how to organize their time and work. Many students indicated that they had not been aware of the extent that they plagiarized in the past and learned why this was not acceptable. Most students in grade seven said they felt very relieved and good about themselves when the project was over.

When asked the question "Who did you talk to about your project?", most of the students preferred to consult with their parents. Parents were followed closely by friends and thirdly by teachers.

Overall Grade Seven Results:

Students in grade seven engaged in the research process experienced a wide range of feelings. These feelings are quite similar to high school and university students evidenced in Kuhlthau studies. Generally when students were first given the research assignment they were quite excited about the project but were still uncertain about what was expected of them. Selecting a topic and in particular a focus was the most difficult stage for these grade seven students. Four weeks were spent exploring topics and reaching a focus. Many teaching strategies were attempted and much time was spent trying to get students to narrow a topic; however, only 60% were successful. It appears that allowing students free choice in topics created a task that was much too difficult for

these grade seven students. Those students who were able to successfully narrow their topic achieved a much higher grade, 20% on the average (Figure 14).

Grade seven students found that talking about their research papers was most helpful. Parents and friends were their first and second choices, followed by teachers. This need for talking somehow needs to be built into the research process for students at this age level.

This group of grade seven students did not have a clear picture of the stages in the library research process until they were taught these stages. In particular, they were not aware of the pre-focus stages (Figure 5 & Figure 8). The research process then needs to be reviewed before these students participate in other research projects. Once through the process will not provide these students with enough mental practice to understand it. Getting students to assess their work and to consider how they could work differently next time gets students to think about how they learn and to reflect on how to improve their performance. The unwillingness of students at this age to engage in risk taking, as demonstrated by their reluctance to change their general topic once started, is an area that still needs to be explored.

Grade Eight Projects

Using the same process, results of the grade eight surveys, perception questionnaires, flowcharts, final evaluation and students' response journals were explored.

Stage 1: Receive Assignment

Students in grade eight were not as excited about their research projects as were the grade seven students at the initiation point. They generally rated their confidence level lower with an average of 5.4 on the ten point scale. 12 students (33%) rated themselves below five (Figure 12).

The grade eight results on the perception questionnaire and flow charts were quite similar to the grade seven findings. Generally the grade eight students liked to talk to others about their topics. They felt that they were successful in using libraries and did not really like to ask the librarian for advice when exploring a topic. They asked the librarian for help only when they had difficulty in locating materials. At initiation, grade eight students' flow charts included few pre-focus stages. Generally they indicated that after finding a topic, they then got books, took notes and wrote up the paper (Figure 8). The average number of stages they included in their flow charts was exactly the same as the grade seven students (Figure 11).

Stage 2: Select Topic

Students in grade eight generally found it easier to select a general topic that would interest them and that they could find information on than did the grade seven students. The grade eight students were far more willing to change their topics than the grade seven students. They were willing to take a chance, drop their topic and try something new. 56% of the grade eight students changed their general topic from the beginning to the end. Reasons for changing topics included not being able to find information on the topic they initially chose or finding another topic they thought would interest them more. Some students chose topics that were similar to what their friends

were doing, but this was the exception. Students in grade eight had a greater range in topic selection. Unlike the grade seven students who focused on animal studies, the grade eight students delved into all areas of science and into more technical and more difficult topics. Many of the grade eight topics were related to environmental issues such as the greenhouse effect, solar energy and ozone depletion.

Stages 3 & 4: Explore for Focus and Form Focus

There was an increase in how students rated their confidence from initiation to midpoint. At initiation on the average, students rated themselves at 6.3 on the ten point scale (Figure 12). At midpoint 27 of the 37 students had reached a focus. These students rated their confidence level at 6.7. The nine students that had not reached a focus rated themselves at 5.1 (Figure 13). Once students reached a focus they were more confident in themselves. Like the grade seven students, few grade eight pupils reached a focus after midpoint. Only five more of the 37 students (Figure 9).

Stages 5 & 6: Collect Information and Prepare to Present

Students were generally very relieved and confident at the completion of their projects. On the average they rated their confidence level at 7.6; there were no ratings below four (Figure 12). Some commented that they felt that they had accomplished a great deal and were excited that their project had gone well. Of the grade eight students, 89% did reach a focus in their papers (Figure 10). The average mark of those students that were able to narrow their topics was 79% while students who were not able to reach a focus received an average of 56% (Figure 14). There was a 23% mark difference between the students that did narrow their topics to those that did not. More of the grade

eight students changed their general topics from the initiation to the completion. However, changing topics did not mean that students would or would not reach a focus.

Stage 7: Assessing the Process

Grade eight students were also given a final perception questionnaire and flow chart in order to compare their final thoughts to their initial understanding of the research process. Generally more research stages were included in the flow charts; an increase on the average from seven to 11 (Figure 11). Most students included in these four extra steps pre-focus stages, such as narrowing a topic, thinking and talking about a topic and reading to explore topics (Figure 8). Students at the initiation included zero to one steps from receiving the assignment to forming a focus while at the completion students included two or three. Like the grade seven students, the grade eight students were more aware of the research process and in particular the pre-focus steps needed to form a focus.

On the final survey students were asked to assess themselves on how they would proceed differently the next time they were asked to complete a research assignment. Almost all of the students commented that they would narrow their topic sooner. They found this stage to be the most time consuming and most difficult. They felt that they had not used their time constructively and that they tended to put things off and as a result were rushed at the end. They indicated that they learned to note take and to better organize their materials. Many of the grade eight students used outside resources such as information from the public library and experts in the field they were researching. They were not reluctant to go elsewhere for their information. Although they felt that our school library had limited resources on their topics this did not deter them from their selection of topics. On the whole the grade eight students talked to more people about their topics than the grade seven students. Mostly they conferred with their family

members, often parents, but they also consulted with their friends, teachers and outside experts.

Overall Grade Eight Results:

Some differences were noted between the grade seven and eight students. On the whole more grade eight students were focused in their papers. Of the grade eight students, 89% successfully narrowed their topics while only 60% of the grade seven students reached a focus. The grade seven students were more reluctant to change their initial topic than were the grade eight students. Also, the grade eight students talked to more people about their topics and were more willing to seek resources outside the school library, such as university professors, research scientists, military officers, doctors and other medical professionals. The grade eight students had more exposure to science and as a result researched a variety of science related topics and in greater detail.

Summary

Junior high school students experience similar feelings during the research process as do the high school and university students noted in Kuhlthau's studies. As well the most difficult stage in the research process for junior high school students is forming the focus. Those students that did narrow their topics successfully averaged 20-23% better on their final grades (Figure 14). Once students reached a focus they were more confident and achieved more satisfaction.

Junior high school students like to talk about their projects. Parents and friends are their first preference followed by teachers. They generally do not use the teacher-librarian when considering topic selection or exploring for a focus. They ask the teacher-

librarian only for assistance in locating materials. Once students had been taught the research process they were more aware of the procedure and in particular included the pre-focus stages in the process in the final flow chart (Figures 5 & 8). All students felt that they did not use their time wisely and would narrow their topics sooner on the next research assignment. They felt that they had learned how to take notes and how to better organize themselves.

Figure 5

Number of Pre-focus Steps: Grade 7

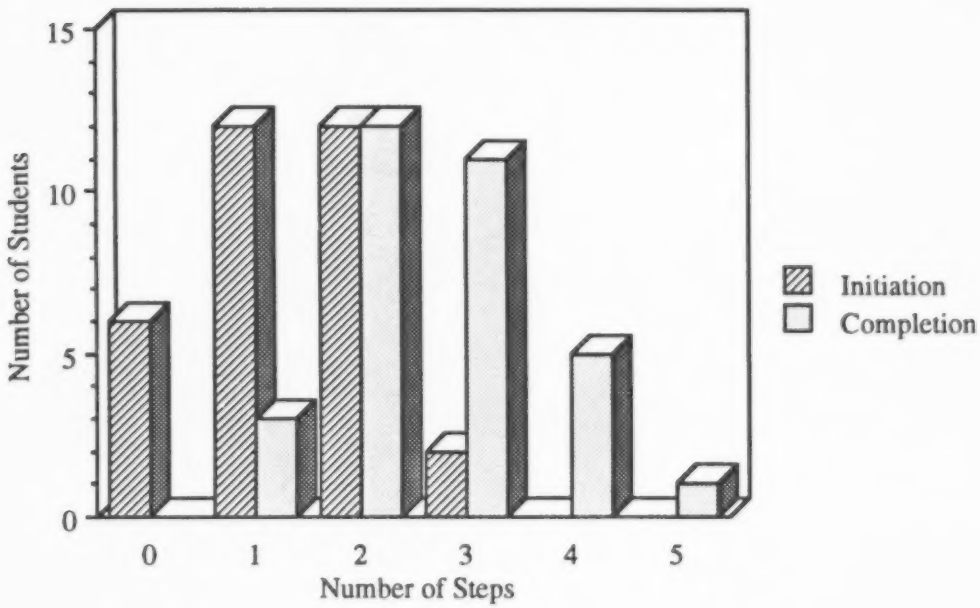


Figure 6

Number of Students Focused and Unfocused: Grade 7

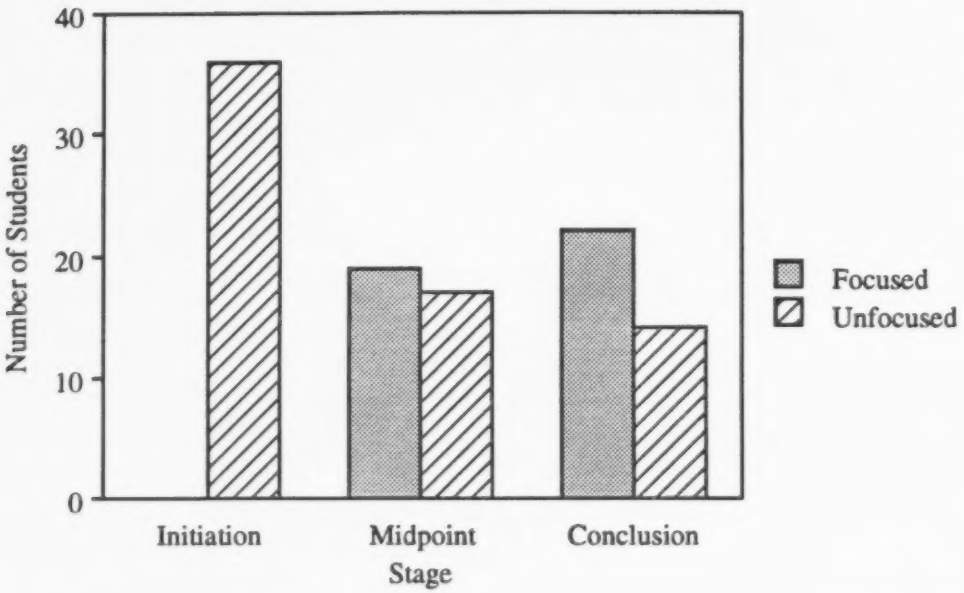


Figure 7

Total Number of Students: Focused and Unfocused at Completion: Grade 7

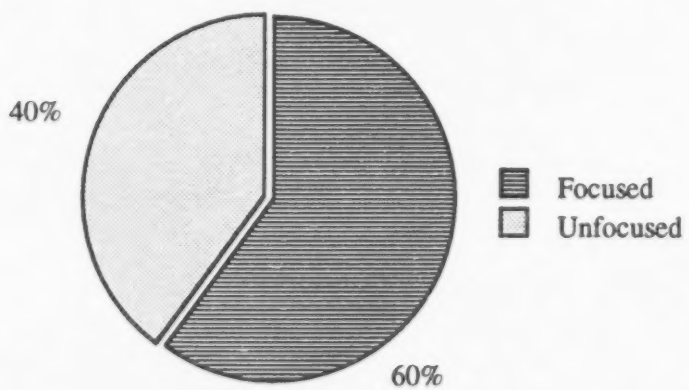


Figure 8

Number of Pre-focus Steps: Grade 8

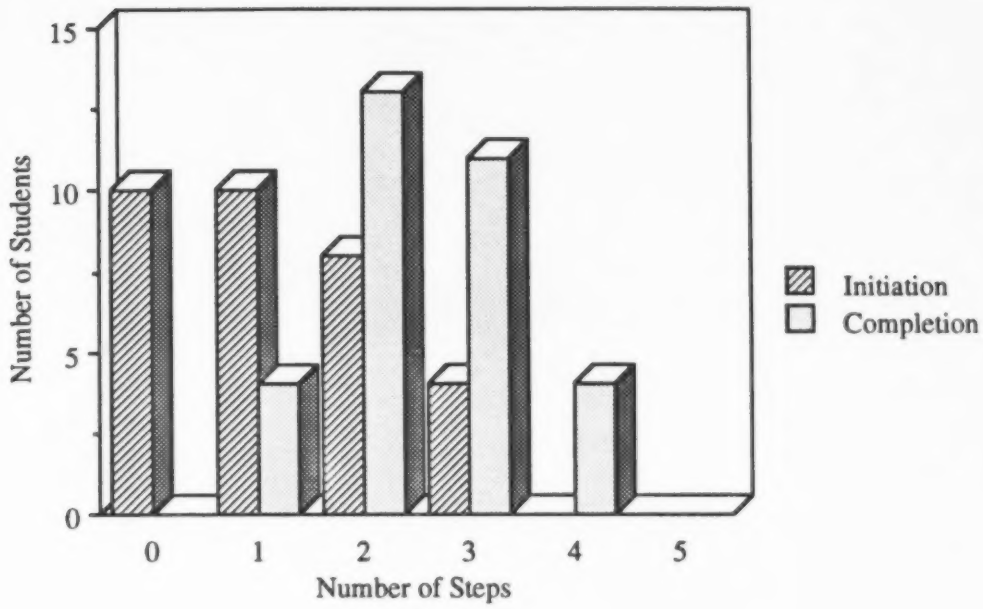


Figure 9

Number of Students Focused and Unfocused: Grade 8

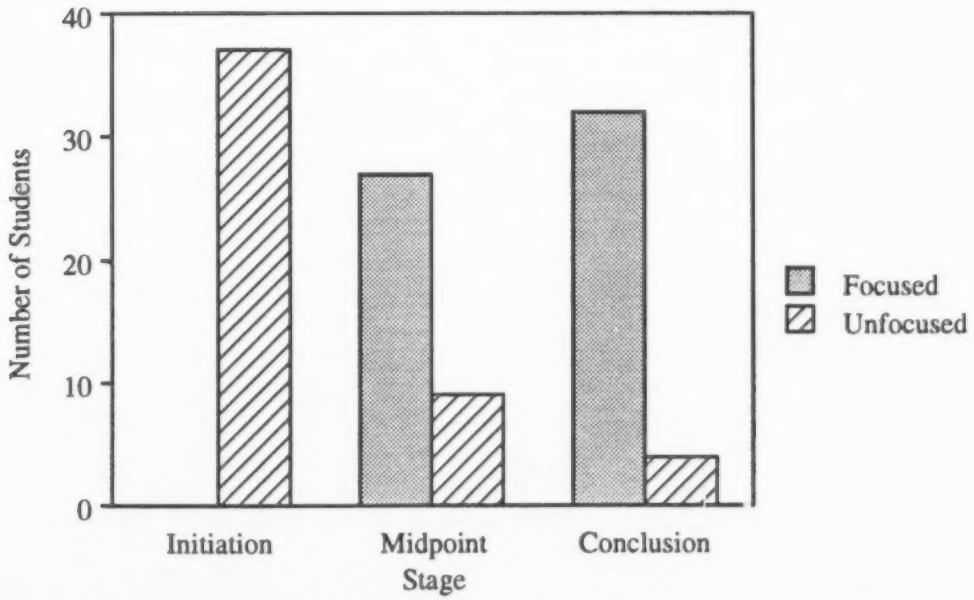


Figure 10

Total Number of Students Focused and Unfocused at Completion: Grade 8

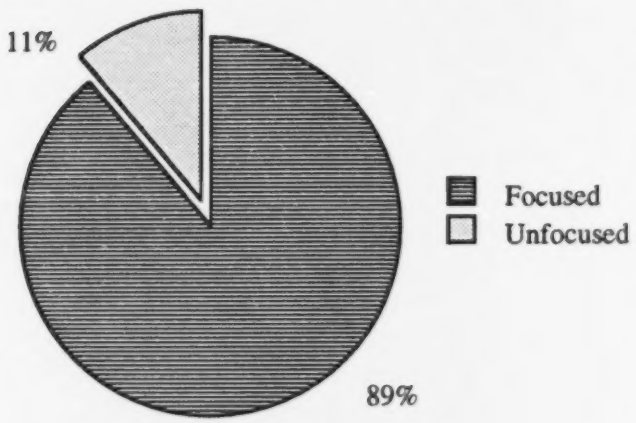


Figure 11

Average Number of Steps in Flow Chart: Grade 7 & 8

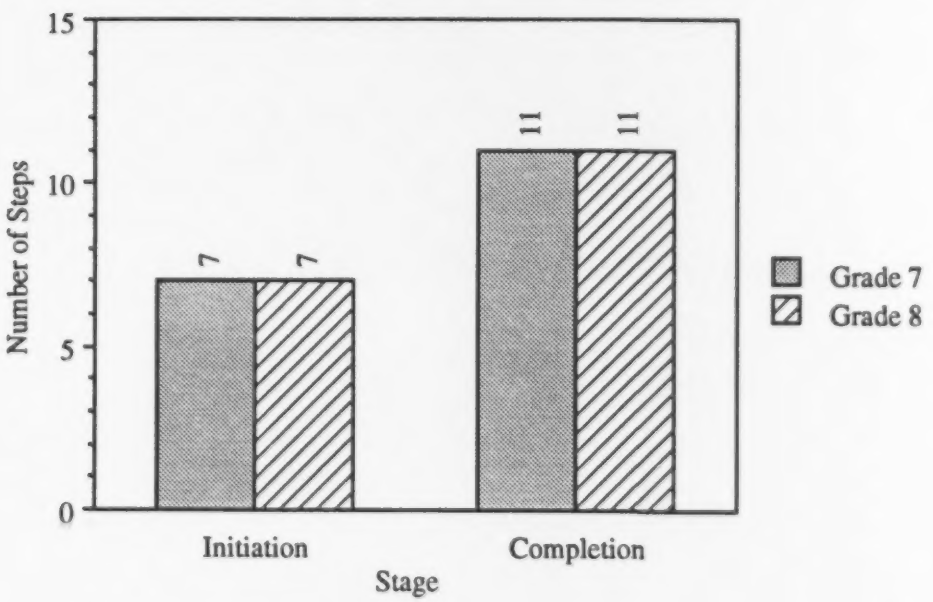


Figure 12

Confidence Level: Overall Average Results: Grade 7 & 8

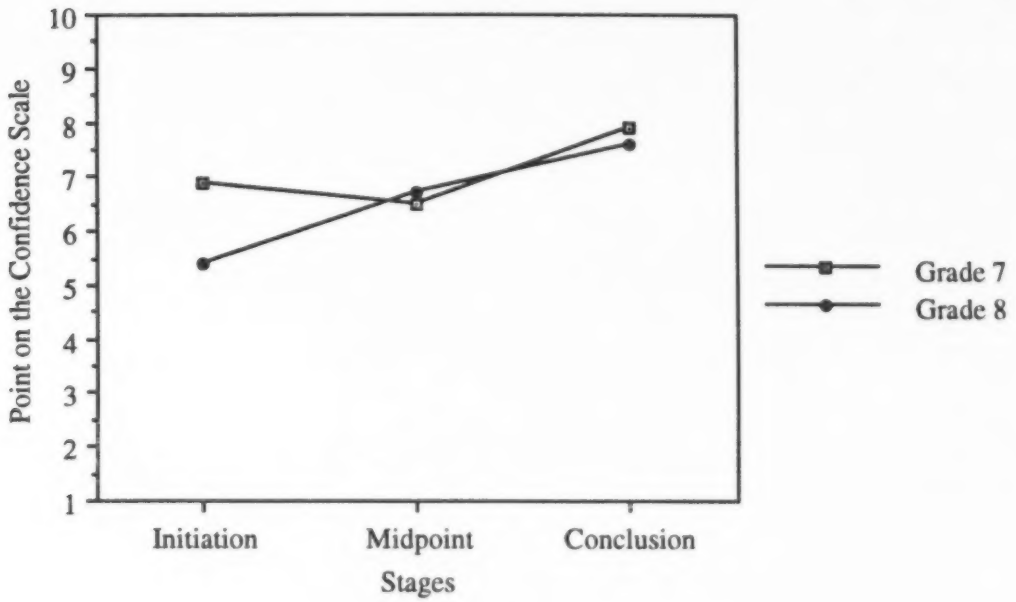


Figure 13

Confidence Level of Focused and Unfocused Students: Grade 7 & 8

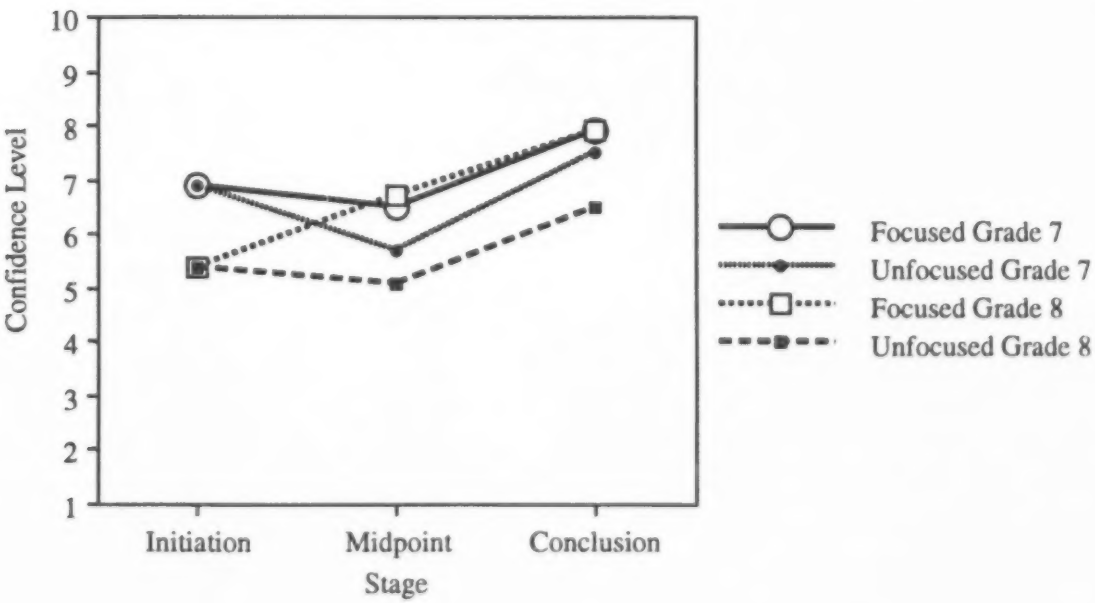
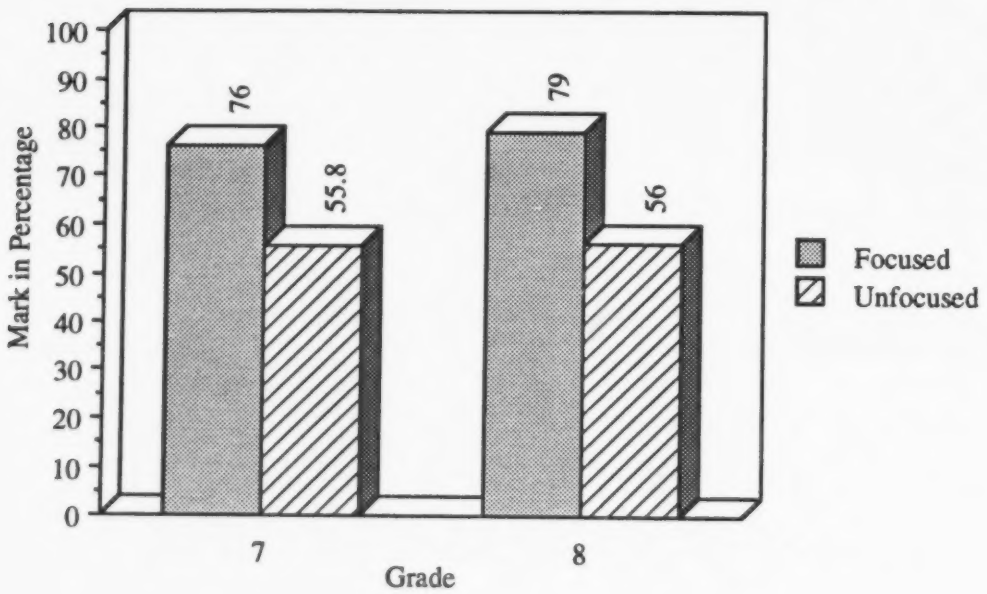


Figure 14

Average Student Mark on Essay: Grade 7 & 8



CHAPTER SIX

Findings: Student Stories

Introduction

This chapter explores how six students worked through the library research process and gives a glimpse into their feelings and thoughts as they completed their projects. These students are examples of the general themes that emerged from the data collected from all the students in grades seven and eight. This information will be helpful in providing insight into the emotional and intellectual states experienced by junior high school students as they work through library research projects. As well, reviewing the successful and unsuccessful strategies these students used in each stage, may be beneficial to teachers and teacher-librarians when teaching the library research process. Two of the students, Sasha in grade seven and Chris in grade eight, were successful in finding a narrowed topic for their research projects. A closer look at Sasha's and Chris's stories will provide insight into why these students were able to reach a focus in their papers and what strategies and skills they used in this independent learning experience.

Four of the students, Rebecca and Von in grade seven and Rick and Brenda in grade eight were not successful in reaching a focus in their library research projects. How these students worked through the research process and what their feelings and thoughts were as they completed their projects will help us understand why some students have difficulty completing library research projects.

Sasha's story

Sasha was interested in the oil spill in the Middle East as it was a current news item at the time of her project. She was very excited about starting her research project and rated her confidence level at ten on the ten point scale. She felt optimistic, satisfied and sure of herself. From her survey and perception questionnaire at the initiation point, it appeared that Sasha was not sure of her search plan and that she felt that her major task was to gather information on her topic.

Sasha's journal entries indicated that soon after she began her search for information she became aware of the difficulties she faced in finding information on a current topic. She immediately checked periodical and newspaper articles at both the school and public libraries. In her search for information, Sasha discovered that there were few references for the oil spill in the Middle East; however, she found ample information on the Exxon Valdez oil spill. She made the decision to change her specific topic while remaining with the general topic of oil spills. Here is an entry from her journal.

> Guess what? I had to change my topic again. Although I would love to do my project on the Gulf Oil Spill there is not enough information at hand. But there is a lot on the Exxon Valdese so I will do my project on the Valdese and why they couldn't clean it up.

At midpoint, Sasha indicated that although she was still confident about herself and optimistic about her project, she was experiencing frustration and confusion because her topic was still too broad and she still needed to narrow it down. She rated herself at six, much lower than the ten rating she gave herself at the initiation point (Figure 25). Sasha stated that she wanted to gain a sense of direction and clarity and that she needed specific questions to focus on in her topic. She felt that she needed to read and talk more on her topic and to recheck her sources. As Sasha got more involved in her topic she became more interested in what she was learning. After rechecking her sources and reading

through her references, Sasha decided to focus in on methods the Exxon corporation used to clean the oil spill. Sasha took advice from her teachers. Rather than taking copious amounts of notes she relaxed, read and reflected on her topic. After considerably more reading and reflecting Sasha then narrowed her topic again to the bioremediation technique in dealing with oil spills since it appeared to be most interesting and an environmentally safe method. Here is another excerpt from her response journal:

> Today I had to continually narrow my topic. I chose to do my report on shorelines and how they used oil eating bacteria to clean (or should I say eat) up the oil. I began taking notes on my topic.

At completion Sasha was very confident, relieved, sure optimistic and satisfied, rating herself at 9.5 on the confidence scale (Figure 25). She was excited about preparing for her visual presentation. Sasha's essay and her visual presentation were outstanding. Sasha designed a three dimensional map of the Alaska coastline depicting the extent of the oil spill and clean up.

From Sasha's perception questionnaire at completion, it was obvious that she had a clear picture of the research process. She included sixteen steps in the flow chart of her library search. Five steps described just the pre-focus stages. These included: "look for possible topics, find out more on two or three topics, choose a topic, draw a mind grid or possible questions, choose a few specific questions to answer, go to the to library and get information on the topic" (Figures 15 & 16). She was very aware of how she worked through the research process and what worked best for her.

Sasha felt that talking to others about a topic was very helpful. Sasha conferred with her parents, peers, science teachers, the school librarian and the public librarian during the research process. She was willing to make several trips to the public library and she asked the librarians for help and advice when exploring her topic and finding information and sources. Sasha was aware that her focus would emerge as she gathered her information. Often what she read was confusing and conflicted with her previous

knowledge. As a result she liked to talk about her topic to get a clear picture and gain reassurance that she was proceeding successfully. She also found that as she gathered information she became more interested in her topic.

Sasha is a questioning, curious student who listens to advice given to her. She takes advantage of all resources available to her. She attended an evening workshop on study skills organized by the vice-principal of the school. She used a worksheet that she received at this workshop to help her focus on specific questions and come to a narrowed topic (Figure 17). Sasha is very persistent and hardworking. She is also confident in herself. Even when she was frustrated with her topic she was still sure that she would be successful with her project. Sasha gets a lot of parental support and often talks to them about her school work. They gave her advice on her topic, attended the study skills workshop with her and helped her edit her project. Sasha is a perfectionist, always wanting to do better and learn more.

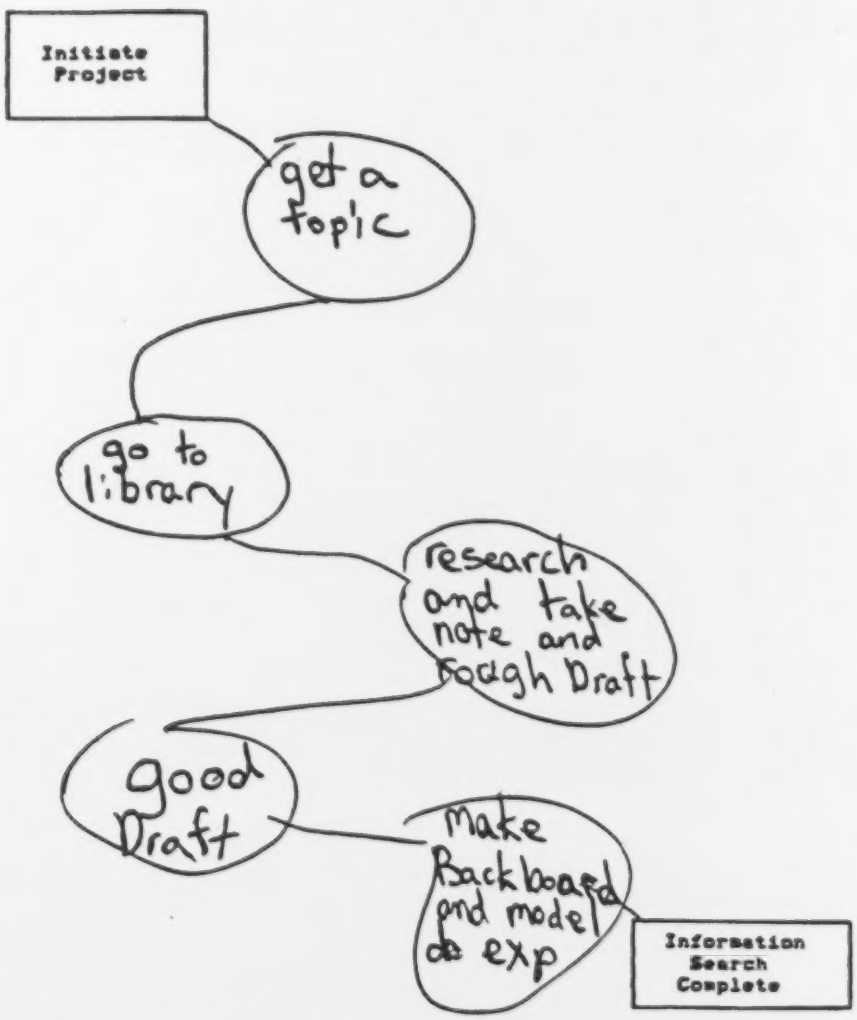
From this description, it is evident that Sasha is a self-regulated learner. She is active in her own learning in that she plans, organizes, self-instructs and self-evaluates. She approaches learning with a meaning orientation and is intrinsically motivated. As a result, Sasha's deep level processing has lead her to productive learning.

Date: _____

Figure 15

Sasha's Flow Chart at Initiation

Make a Flow Chart of Your Library Search by Connecting Boxes



Date: _____

Figure 16

Sasha's Flow Chart at Completion

Make a Flow Chart of Your Library Search by Connecting Boxes

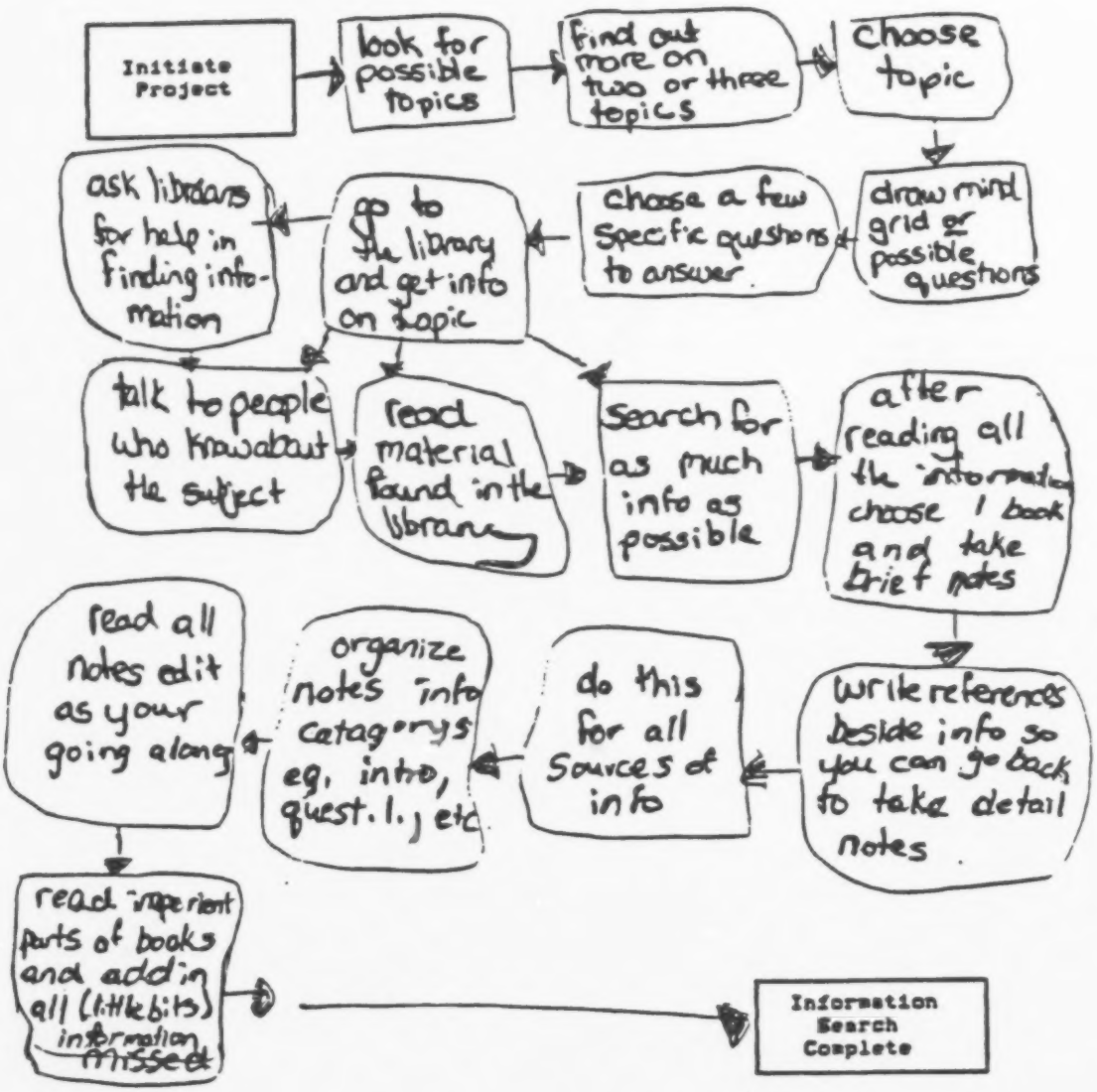

Initiate Project
look for possible topics
find out more on two or three topics
choose topic
draw mind grid or possible questions
choose a few specific questions to answer
go to the library and get info on topic
ask librarians for help in finding information
talk to people who know about the subject
read material found in the library
search for as much info as possible
after reading all the information choose 1 book and take brief notes
write references beside info so you can go back to take detail notes
do this for all sources of info
organize notes into catagorys eg. intro, quest. l., etc
read all notes edit as your going along
read important parts of books and adding all (little bits) information missed
Information Search Complete

Figure 17

Sasha's Idea Diagram from Workshop

Chris's story

Chris had his general topic, solar energy, from the initiation point of his project. This general topic became more focused at midpoint and then again at the completion. This is evident in the survey questions Chris completed. When asked to describe his topic in a short paragraph, here are Chris's responses from the initiation, midpoint and completion surveys.

> Initiation:
> My topic is solar power. I am going to; mainly focus on how the sun's energy is transformed into power and advantages and disadvantages of it.
> Midpoint:
> My topic is solar heating, the best way to heat a home. It will include things like how to make a solar panel and where to put it. For my model I am going to make a solar house.
> Completion:
> My topic is on solar heating a house. I am looking at passive heating which is the architectural design of the house.

Chris chose to focus on passive solar power and how to design a home to take advantage of solar energy. His confidence level increased as he became more focused. Chris rated himself at five at the initiation point, seven at the midpoint and eight at the completion of his project (Figure 25). As he became more focused his confidence level increased.

Over the project duration Chris's flow chart of the research process increased by six steps, beginning with six stages at the initiation point and developing into twelve at the completion (Figure 18, 19 & 24). Although it is evident that Chris was more aware of the steps in the research process, he did not include extra pre-focus steps other than finding a topic.

Chris relied on his parents for help and talked to them about his project. His father is an engineer; it is interesting to note how related Chris's topic was to his father's career.

At first Chris was concerned with taking notes on every book he gathered. He changed his mind about this approach stating on the final evaluation form that it was necessary to "take only important notes." Chris felt that getting a narrowed topic as quickly as possible was important to use time wisely. Chris is very task oriented. This is quite evident in his daily response journal where he wrote what he planned to accomplish each day and then stated what he actually was able to get done and what he needed to do for homework. Here are a few examples:

> February 26, 1991.
> Today I plan to get some notes on my topic, solar heating. Today I took a few notes and need to finish the web on my questions.
> March 4, 1991.
> Today I plan to get points on a book I got from the Southgate library. Today I accomplished taking notes from the book. I got 1/2 of a page of notes.
> March 7, 1991.
> Today I continued taking notes. I should be done tomorrow at home, then I can finally start on my rough draft. I can't wait till I start on my model.

Chris is an independent worker who only asked questions when stuck. He always tried to work things out first for himself and many times checked with the teacher only to get assurance that what he was doing was correct. Chris got a lot of family support while working on his project. What Chris does at school is very important to his parents thus, he had many opportunities to discuss his project at home.

Chris, like Sasha, felt a need to gain a sense of direction and clarity while working on his project. Information that seemed confusing and did not fit in the beginning became clearer as more information was gathered. He became more involved in his topic as he worked through his project.

Chris designed a very sophisticated model solar home utilizing the information he had researched. From his comments in the daily response journal, it is evident that he looked forward to building his model all throughout the researching of his paper. His

display attracted much attention from his peers, teachers and community members at the school open house.

Chris, like Sasha, was a self-regulated learner who was successful in independent learning and thinking. His orientation to learning was different from Sasha's in that his source of motivation was to achieve. He approached this research assignment like a competitive game. He organized his work, met all the required deadlines and played to win. Although successful, Chris did not experience the kind of deep-level processing from this learning situation as he could have had he been intrinsically motivated. He was more interested with the building of his model than the information he needed to learn about how it worked. Although he handed in each component of the research assignment and his essay was technically correct, he had trouble answering some of the classes' questions on passive solar heating. Both Chris and Sasha are high achievers. They are independent, hard workers and not afraid to ask for advice when needed. Both have a great deal of parental support and schooling is valued in their homes.

Summary:

Both Chris and Sasha needed to gain a sense of direction and clarity when working on their projects. When information seemed confusing they did not give up but continued to read and ask questions to clarify points. They followed instructions well and handed in all their work on time. They liked structure. They liked knowing time limits, the requirements for the project and the evaluation criteria. They were task oriented and planned their work. Both students were quite reflective about their thought processes, how they learn best and what they would do better next time. Their metacognitive strategies should enable these students to successfully work through the research process in future projects and assignments. Chris and Sasha became more confident as they became more

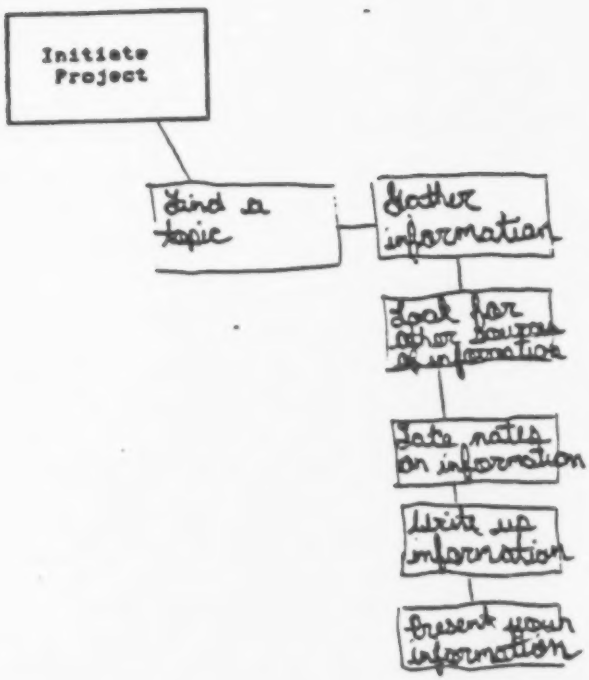
focused in their projects. Both Chris and Sasha liked to talk to people about their projects. Parents were the first choice for both students although they also sought reassurance form their teachers. The skills and strategies that these students display show evidence of successful life long learners.

Date: _____

Figure 18

Chris's Flow Chart at Initiation

Make a Flow Chart of Your Library Search by Connecting Boxes

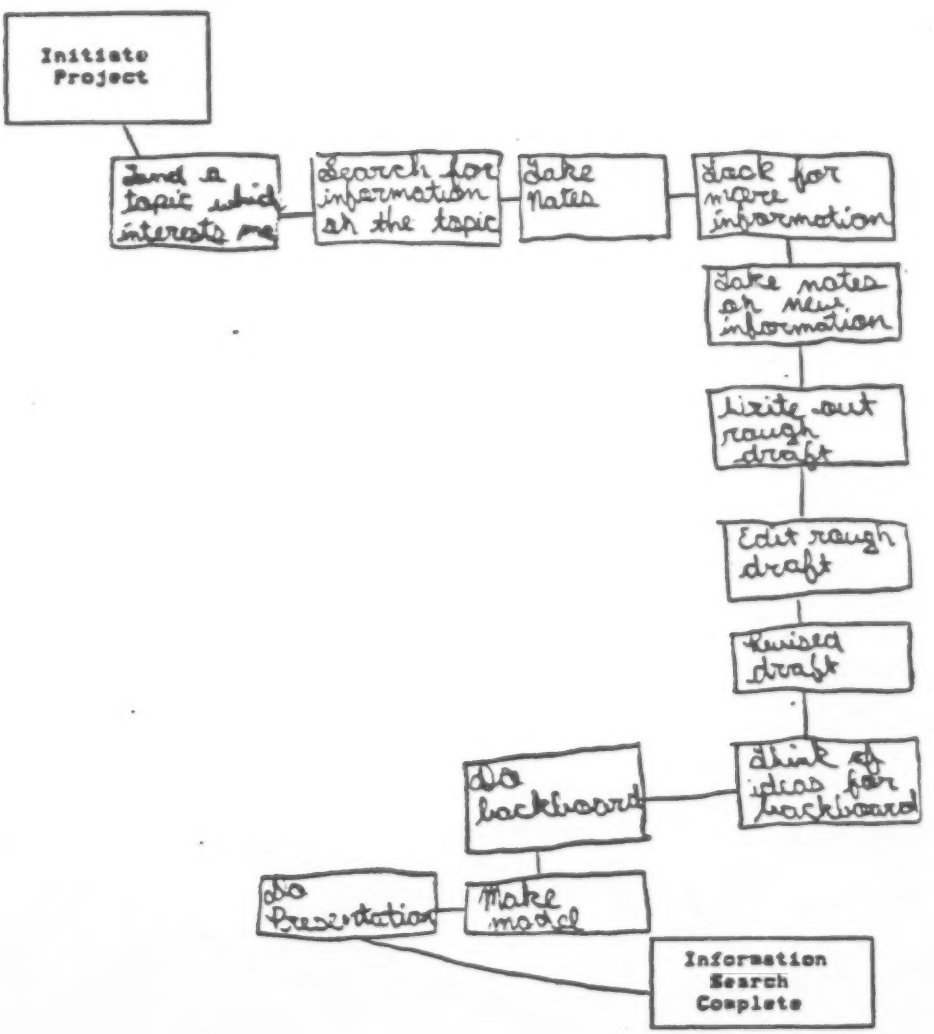


Date: _____

Figure 19

Chris's Flow Chart at Completion

Make a Flow Chart of Your Library Search by Connecting Boxes



Rebecca, Von, Rick and Brenda were not successful in reaching a focus or narrowing their topics in their papers. With the exception of Von, these students did not receive a passing grade on the essay component of the research project. How these students worked through the research process and what their feelings and thoughts were as they completed their projects will provide an understanding of some of the difficulties students at the junior high school level experience when completing library research projects.

Rebecca's story

Rebecca was very optimistic throughout her research assignment rating her confidence level at 7.5 at initiation, 8.5 at midpoint and 9.0 at completion (Figure 25). At the initiation point she indicated that she felt that this assignment was "really good" and was "going to help her." At both the midpoint and completion she described herself as confident, sure and satisfied.

Rebecca investigated air pollution and how it affects us. Even though Rebecca prepared an outline, her essay was poorly organized. Interestingly, when asked what was the most useful thing she learned during this project, Rebecca indicated knowing "how to categorize my notes and how to get the report in order." She was aware that to be successful in future research reports she needed to organize her information better.

Rebecca did not appear to have a clear picture as to what she was investigating. As a result, her conclusions lacked supporting details. She did not have a bibliography, nor did she include any of her notes in her final submission. She mentioned in her response journal that she had difficulty comprehending what she was reading and needed help from her friends to understand the material. Rebecca's reading level may be low: she only used

junior encyclopedias as her source of information. Here is one entry from her response journal:

> Next science class I will be well on my way to my rough copy. I've got most all of my notes taken and I feel so excited with this report. But also if my friend Leah wouldn't have been here I would not know what I was reading about in my book. So what I also did was talk to her about my topic so I could understand it more.

When asked to make a flow chart of her library search at the initiation point, Rebecca listed a number of topics, duplicating a webbing exercise we had just completed (Figure 20). She did not understand what was expected of her nor did she clarify her confusion with her teachers. At the completion of her project Rebecca included eighteen steps in her flow chart. She had become more aware of the steps in the research process she had been taught. However, Rebecca still was confused about the sequence of the steps in the research process. The flow chart was very disorganized and did not follow a pattern. Many steps were included but not in any particular order. For example, she indicated that she would get her notes and categorize them before she would get her topic (Figure 21).

Rebecca did not at any time ask her teachers for help. We were unaware that she was experiencing difficulty until the rough draft was handed. All other parts of her research project, such as webbing and outlines, were submitted on time and Rebecca appeared to be following and understanding. She kept any problems she was having from her teachers throughout the three months we worked on the library research project.

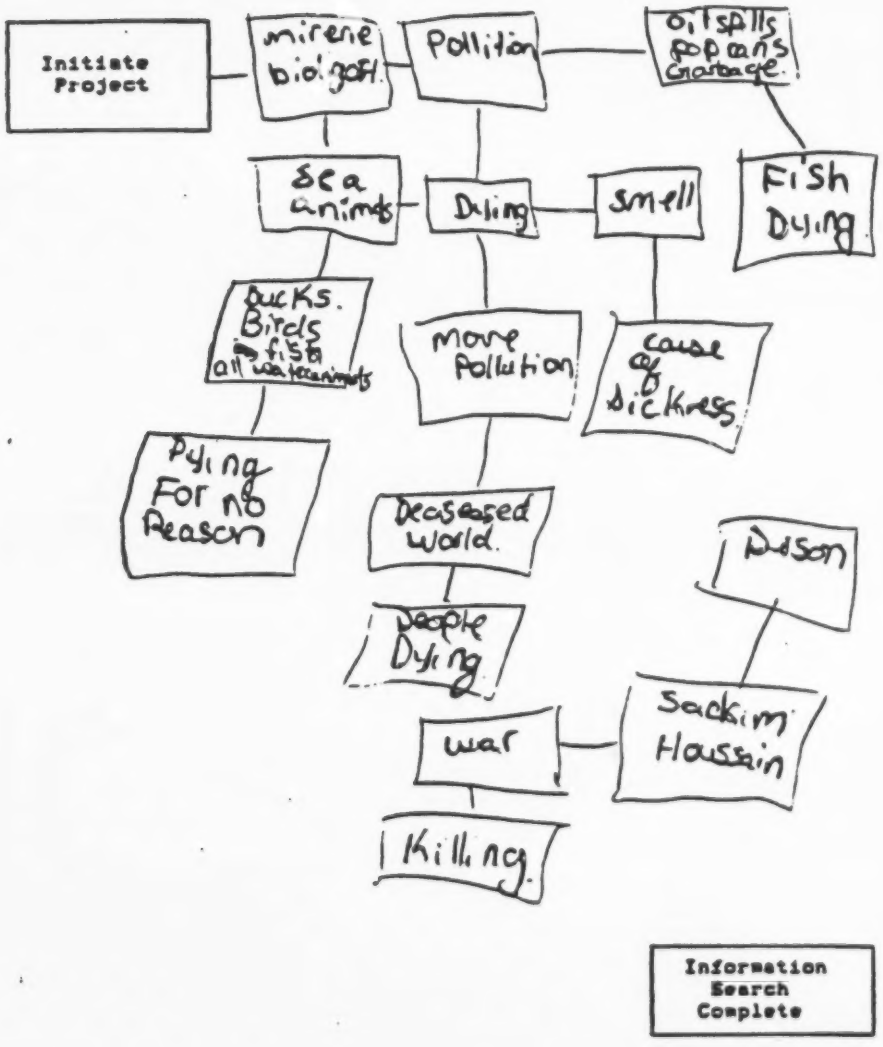
Rebecca had trouble coming to a focus primarily because she could not comprehend her resource materials. Rebecca does not do well in school. She has difficulty with science and other core subjects. She tries very hard in all her assignments and takes any advice her teachers give her. However, even though Rebecca handed in all her checkpoint assignments and appeared to be progressing successfully, she had trouble organizing her thoughts and narrowing her topic.

Date: _____

Figure 20

Rebecca's Flow Chart at Initiation

Make a Flow Chart of Your Library Search by Connecting Boxes

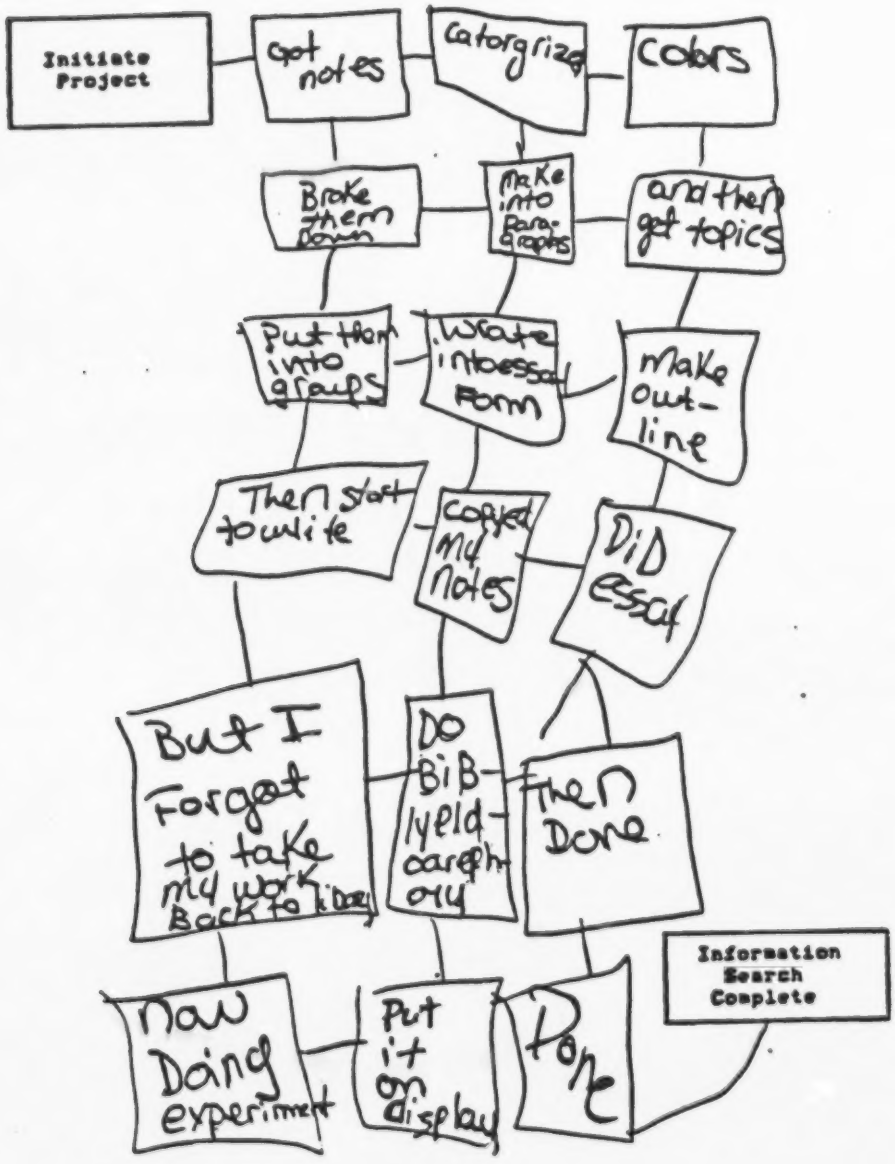


Date: _____

Figure 21

Rebecca's Flow Chart at Completion

Make a Flow Chart of Your Library Search by Connecting Boxes



Von's story

Von was very confident and sure of himself throughout the research process. He rated his confidence level at ten at initiation, nine at midpoint and ten at the completion (Figure 25). However, Von did indicate that he was frustrated with the initial webbing exercise. Here is what he wrote in his response journal.

> Finding what to do was hard. The webbing confused me. I felt frustrated today. I hope the next day will be easier. . . . . I don't want to do an easy project but I don't want to do a hard one!

We encouraged Von at this point and explained that during the initial stages he would feel frustration as he was exploring for a focus, part of the research process which was the most difficult. Von was anxious to get a topic and to get started. He did not want to spend time brainstorming and webbing for ideas. He did not want to feel frustrated. He wanted to get down to work and get on task.

We had many discussions with Von about his topic and the fact that it was very general. He wanted to investigate all aspects of water, its uses, related problems and future concerns. He indicated that he did not want to delve into one or two aspects of water because he was afraid he would not have enough information. He felt that the length of the essay was more important than the content. Here is what he wrote in his response journal as we continued to encourage him to narrow his topic:

> I know what I want to do now. I want to do WATER. I think it will be a fun thing to do. It seems to have a lot on it. Today I looked through an encyclopedia and it had 20 pages on WATER alone. I think I will be able to do a good project on water. It was easy to find some information on WATER. There was a whole bunch of information I have already gotten on my project from the Southgate library. Today I started doing some notes and read some books on my project. I can not find enough information on just one project. . . . If I did just one thing I could probably only get 1 1/2 pages of information.

Von does not like to redo his work and does not listen to advice. He stated that he never asks a librarian for help to find resources or to help him develop a focus. He claimed that he does not like to talk to others about his topic and that he does not find this to be helpful. He indicated in the perception questionnaire that his thoughts never change about a topic as he explores information. His flow chart at completion did not include any pre-focus stages. Getting a topic and finding a focus was not included in the flow chart. Getting books and finding lots of resources was listed in three steps in his research process. He did not want to be frustrated and did not want to spend time finding a topic. He just wanted to get started and work on a topic that had lots of information that was easily accessible.

Von's unwillingness to question and to reflect impeded his success at reaching a focus for his paper. Although Von does quite well in school and is an honors student in science, he did not do as well as he expected to on his research assignment. Every exercise in the essay and presentation component of the project was handed in neatly and on time. Von's folder was exceptionally well organized.

Von was extrinsically motivated, concerned about getting the task completed rather than what was to be learned. Von's lack of success, due to his failure to reflect, supports a finding from Kuhlthau's studies which indicate that relaxing, reading and reflecting is an important stage in forming a focus. Von needs to learn that feeling frustrated is a natural emotion when involved in the research process and that time is required to explore information in order to develop a focus.

Rick's story

Rick chose to investigate tarantulas because of an article he read in the newspaper about the Provincial Museum hosting the first recorded case of tarantulas reproducing in

captivity. At both the initiation and midpoint Rick indicated that he was confident in what he was doing and very excited about his project (Figure 20). He appeared hopeful about his project and eager about his future plans.

> Tuesday March 5, 1991:
> Today I'm going to take notes from a newspaper article (March 4/Journal, Spiders/ A1/A2). Today I took notes from a newspaper an organized my notes. I have found someone to talk to and hopefully can get an interview. Maybe I can even get a tarantula.

Rick wrote a list of four questions he planned to investigate related to the hunting skills of the tarantula. At this point Rick appeared to have successfully narrowed his topic. He was confident and had specific plans on how he intended to complete his project (Figures 22 & 23).

> Today I plan to totally drain our school library. I want to go to another library out of school for more information. I'm also going to ask the teacher where we can keep our tarantula. We're asking 4 questions. 1. When it bites, what chemicals does it give off? 2. How does it catch its prey? 3. How does it kill and eat its prey? 4. What senses does it have to help zero in on its prey.
> Today I almost finished taking notes on the hunting skills and hope to next class, phone someone at the museum. Then we can maybe observe the spiders and take pictures. Now I have a lot more notes.

Something happened between the midpoint and completion of Rick's project. His plans for buying and keeping a tarantula at home or school did not work out and so Rick seemed to lose interest in his topic. He did not focus his essay on the hunting skills of the tarantula nor did he go to the Provincial Museum to speak with the officials on the work they were doing with tarantulas as he had planned. Instead he turned in a very general paper based on information found in encyclopedias.

Noted in Rick's flow chart from the initiation to the completion of his project was a decrease in the number of steps he included in his library search by five. This could be the result of a lack of interest Rick showed in his final stages of his library research project (Figure 24). At completion he put little effort into the survey, perception questionnaire and

flow chart, only answering a few questions. On the final evaluation form when asked, "If you were starting this project again, what would you do differently?", Rick appeared to be aware of the need to develop a focus even though he had not included this step in his flow chart. He commented, "I would go to other libraries and narrow my topic more." He knew even before handing in his essay the reasons why he would not do well. Why was Rick complacent with a poor result and why did he lose interest in his topic?

Rick does quite well in science and in his other core subjects. He shows signs of metacognition in knowing what he was successful at doing and what he needed to do to be successful in future projects. Whether in fact, Rick follows through on his plan would be an interesting follow up study.

Figure 22

Rick's Research Plan

My Research Plan

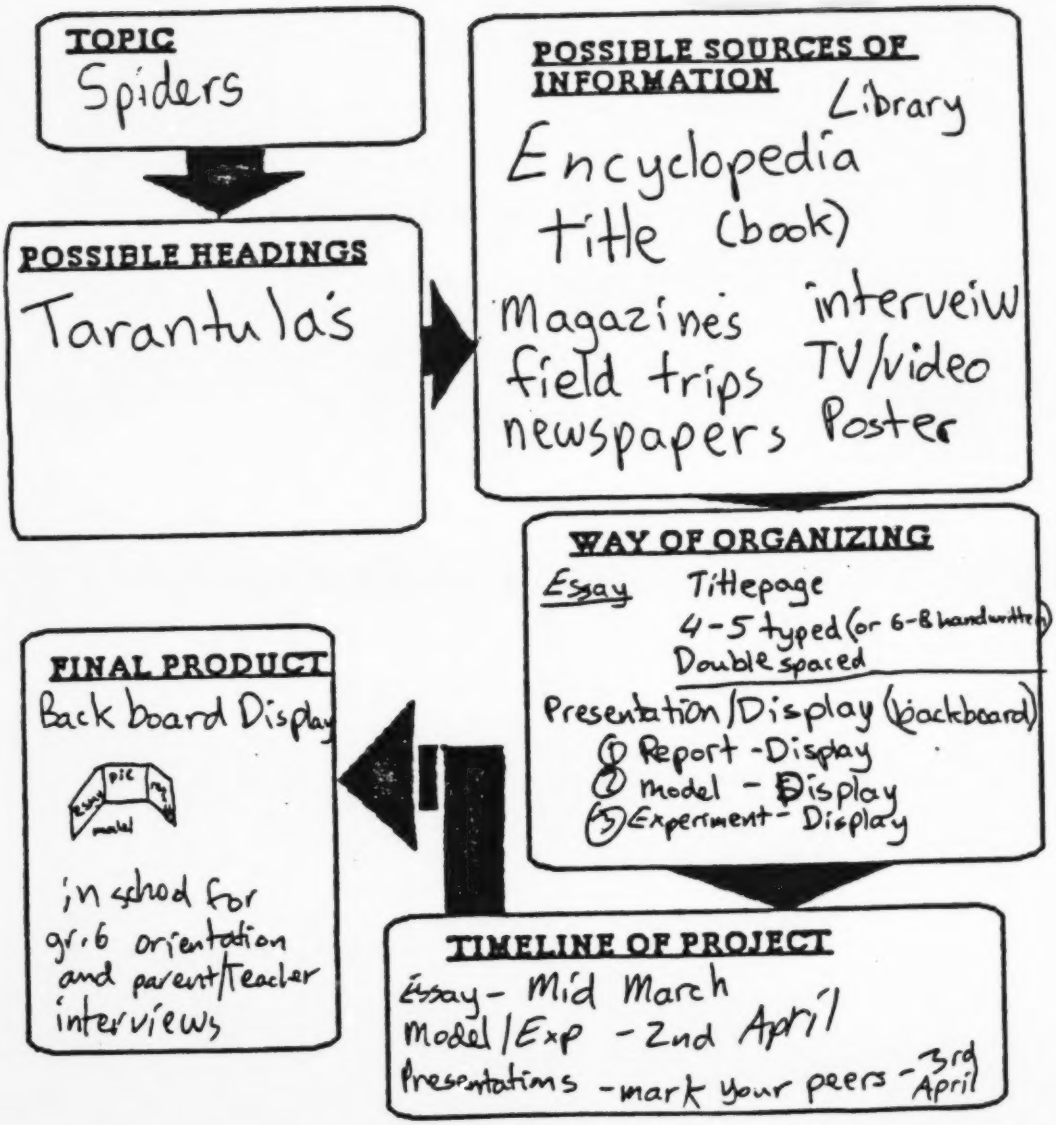


Figure 23

Rick's Limiting the Topic

Limiting the Topic 10 Marks

General Topic: _____

Name: _____ Class: _____

What do I know about this topic	What don't I know about this topic?
- The size of the spider. - That it's bite is like that of a bee's bite. - The bite is not poisonous - it catches it's prey by running and catching. - It has eight eyes on the top of it's head. - It eats harmful insects (pests) - trained as pets - usually not harmful to humans. - they paralize their prey with large fangs. - live for about 20 years.	- what chemicals does it's bite give off, if any? (when it bites) - what does it eat - How does it catch and kill and eat it's prey. - What kind of senses does the Tarantula have to help it zero in on it's prey.

Brenda's story

Brenda rated her confidence level very low at initiation, midpoint and completion, averaging three on the ten point scale (Figure 25). Brenda was very verbal about her confusion and frustration and as a result did get a lot of assistance from her teachers. We coached her through the entire project and were very pleased that she completed all her work. Although Brenda did not achieve a passing grade for the essay component of the science project, she did get a passing grade for the overall project. She was thrilled by her success. She proudly announced that this was the first assignment that she had passed in science all year.

Brenda started her project with a great fear of failure. This is what she wrote one day in her response journal:

> Do you expect a great deal from us? That probably sounds rude to you, but its not meant to be. So please don't take it that way. Its just that I don't exactly know what I'm expected to do. Please explain as much as possible, thanks. Brenda.

We needed to monitor, provide structure and reassure her daily. Students recording their feelings in a daily response journal was an excellent way to keep track of their feelings and concerns. We were able to provide Brenda with the encouragement she needed because we were aware of how she was feeling. Here is another example of Brenda's open communication with us:

> I'm feeling a little more sure of myself today. But I've still got a long way to go. How could you possibly do an experiment on Rain Forests? Could you give me an idea? I think I might do a model, but if I get an idea. . . ."

Brenda insisted on only using one source of information for her essay even though she had been informed that this would result in a lower grade. She found it difficult to link information from a variety of sources, thus she relied on only one source. Possibly this skill was too abstract for Brenda at this time or she could have lacked motivation or

confidence in herself. Brenda is a weak student in all subject areas. She has a poor self-esteem about her abilities as a student.

Brenda indicated on her final evaluation form that she needed to try more if she wanted to be successful in her next assignment. She also indicated that she learned how to collect information for a project. Brenda needs lots of practice at researching to become more confident in the process. Interestingly, once Brenda gained confidence in herself and her topic she was able to do an excellent visual display and oral presentation. Brenda learns better with tactile objects than with written or visual material. She prefers to verbalize her knowledge first, then to write it down. Her knowledge of her topic was very complete. She handled all questions well and surprised both herself and her classmates. Brenda has more abilities than she admits to for but needs lots of encouragement and successful experiences to raise her self-esteem.

Summary

Students who did not come to a focus in their essays did not do as well as those students that did. Students that narrowed their topics averaged twenty percent higher on their papers. The inability to form a focus was not limited to only the low achievers. What prevented students from forming a focus?

Looking at the stories of these four representative students, some common themes emerge. Rebecca and Brenda had trouble reading and comprehending their resource materials. Because these students had difficulty in comprehending their information, it must have been difficult for them to get interested in their topics. Both these students needed more structure, monitoring and encouragement. Many checkpoints need to be built into a project to ensure success, particularly on a first research project. Rebecca needed a topic that she could understand and resources that she could read. Assistance from peer

tutoring would have been one successful teaching strategy, as friends are important to Rebecca. Noted from the literature review, students with higher self-esteems perform better at independent self-regulated learning experiences. Therefore, it is imperative that students experience success at the research process to raise student's confidence level when completing future research projects. The experience should not be overwhelming and beyond the students' abilities so that they fear library research projects.

Why do students like Rick lose interest in their topics midway through? Is the information not stimulating enough to read and reflect on? Why did not he take the initiative to go to the Provincial Museum? Maybe he did not feel the encouragement from school or at home? Maybe he just lost interest in his topic and felt it was too late to change.

Von did not get interested in his topic because he did not allow himself time to reflect and question his information. He was concerned about getting the assignment done and fulfilling all the expected requirements. The end product was Von's major concern.

In order to form a focus, students must become interested in their topics. This cannot be achieved when you have difficulty reading and comprehending the material or when you fear failure. An overriding concern with the process and the end product can hinder developing a genuine interest. Students must feel that they can change their topics if they lose interest and get encouragement when they need it. Somehow we must teach our children to relax, read and reflect if we want our students to maintain an interest in what they are learning. This stage is imperative to forming a focus in the research process.

Figure 24

Number of Steps in Flow Chart: Selected Students

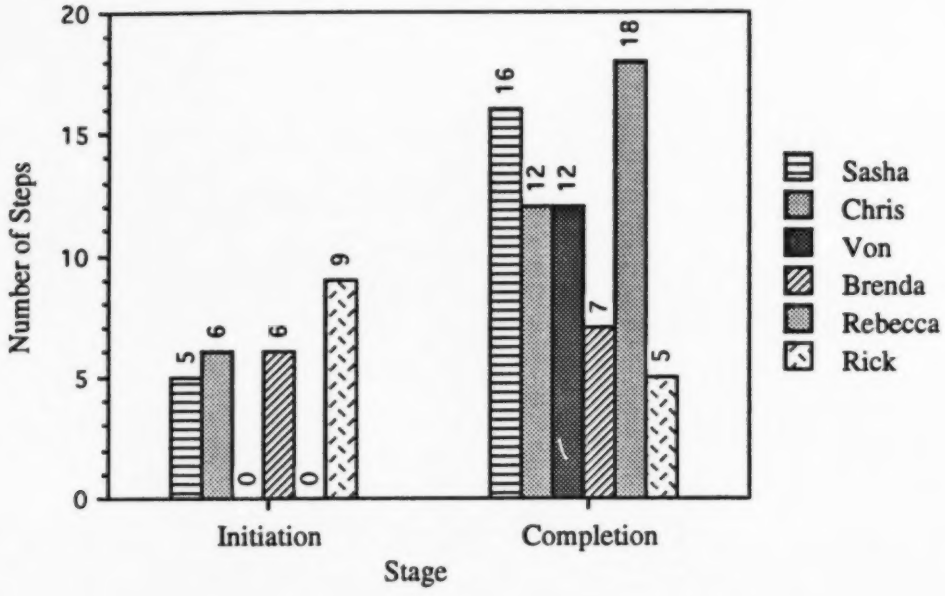
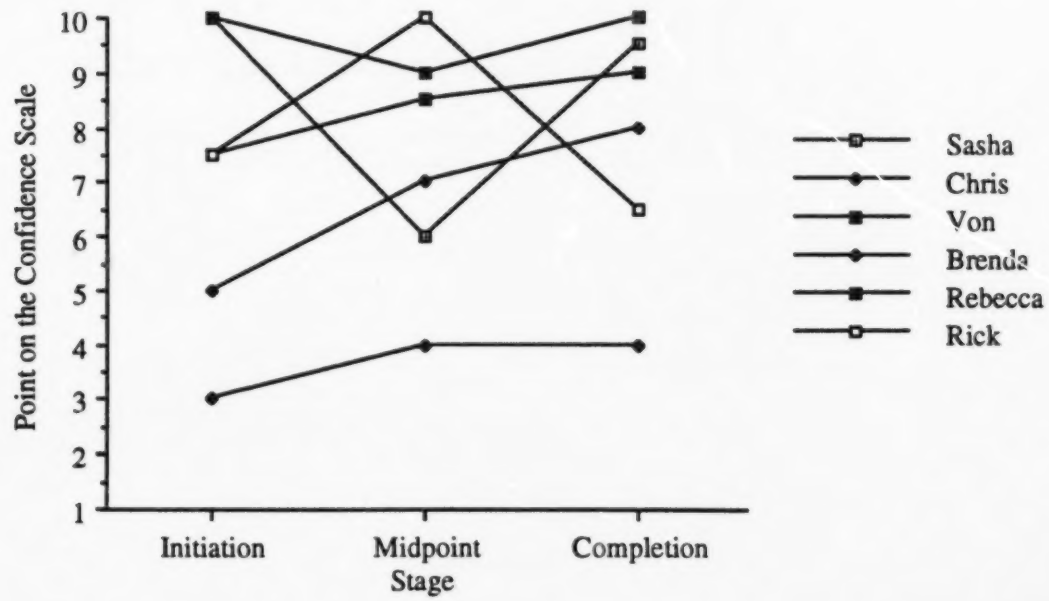


Figure 25

Confidence Level of Selected Students



CHAPTER SEVEN

Implications from the Findings

Introduction

As teachers and teacher-librarians continue to work together, cooperatively planning and teaching resource-based curricula, they will need to continue reflecting and finding better ways to teach students the process of acquiring information, making sense of this information, presenting the findings and evaluating their own information handling processes. This study does not answer all the questions related to teaching the research process but it does suggest some considerations for working on a library research project with junior high school students.

Implications from this study have been classified into two general categories. First, there are considerations for teachers and teacher-librarians providing guided instruction for students doing research projects. Second, there are recommendations for school wide policies.

Considerations for Teachers

This section is divided into three parts: (1) suggestions for topic selection (2) strategies to help students form a focus (3) other considerations for teaching the research process.

Suggestions for Topic Selection:

As noted the grade seven students in this study, had difficulties coming to a focus when the topic selection was left open. This could be due to the fact that these students generally had a limited science knowledge and, therefore, lacked the background knowledge required to narrow and define broad topics. Learning theories stress the need for new experiences to be linked with prior knowledge. If students' experiences in the field being researched are limited, then students will have difficulties researching a range and depth of topics. Secondly, cognitive differences can affect the student's ability to come to a focus. Many students in these grade seven classes were still reasoning at the concrete operational stage The way students, at the concrete level, think and reason will be different from those students who are at the abstract, formal thinking stage. Vygotsky's theory of the "zone of proximal development" supports this conclusion in that Vygotsky emphasizes that learning experiences of children must be based on maturation levels as well as previous knowledge and experiences. Therefore, freedom to choose any topic for a library research project should have been limited for these grade seven. Science fairs are an example of where students are given such freedom in topic selection. This can put a student at a disadvantage if there not support from the home and the school to provide the necessary assistance and background knowledge. Those students in the case study that were successful in coming to a focus were high-achievers or were students who had a lot of parental support. For those students that do not have this support, this process will be more difficult and so the school must provide the best possible instruction and guidance.

By grade eight students in this study were more capable of completing free choice library research projects. However, these students still needed structure and built in checkpoints to ensure that they were not having difficulties. This group of grade eight

students were more capable of abstract thinking and had more exposure to more science topics.

Strategies to Help Students Form a Focus:

Given that coming to a focus is the most difficult stage for junior high school students what strategies are recommended for teachers when instructing the pre-focus stages? Upon initiating the research process a teacher should not simply list a number of topics and have students choose one. Students must be motivated and must develop an information need. This process might begin with brainstorming sessions to generate ideas. Possibly articles, filmstrips or guest speakers might spark this session. Webbing of ideas on charts could initiate discussion of general topics.

Timing is important when incorporating a research project into a unit. Students must have sufficient background information. Therefore, a project involving the research process could be a culminating activity for a unit. Students might keep a reflective journal of their thoughts and feelings throughout the direct teaching part of the unit to be examined when the research activity is about to begin. Possibly an idea recorded in the journal or from a lesson could form an interest or question that a student would like to investigate.

When students are selecting a topic for a research project, they need time to discuss and explore ideas. Large groups, small groups or with partners are possibilities for this activity. Another topic development strategy, in Blakey and Spence (1990) "Thinking For The Future", recommends that students make a chart identifying what they already know about a topic and what they do not know about the topic. Then, as the students begin researching the topic, they can go back to the chart to verify, clarify, expand and replace information to help form a focus. From either of these activities students could then make a research plan where the topic is identified, where information sources can be found, what

presentation format the research will take, for what audience and how it will be evaluated (Alberta Education, 1990).

Strategies for learning metacognitive behavior should be introduced at each stage. This will need to be first taught and modeled by the teacher. Then encouraging students to talk about their strategies and what worked best for them should be a continual practice. Students need to expand their repertoire of strategies so that if one attempt does not work they can try another (Mulcahy, 1991). Thinking and reflecting on what students have learned, how students are feeling and how they will improve on the next research project will help learners deal with new situations (Blakey & Spence, 1990). This can be accomplished through discussions or journal writings.

A student's focus can change several times as more information is retrieved. The teacher or teacher-librarian can act as a consultant helping students at this potentially frustrating time. Often teachers and teacher-librarians are reluctant to let students change their topics once they have started a research project. When you consider that students at this age choose topics because they sound interesting or because their friends are doing similar topics, students may discover after spending some time reading in the field that they want to change their topic to a new one, or slightly change the topic within the general field they have been investigating. Although we do not want students altering their project topic every research period, we should allow students some flexibility and encourage them to reach a focus. Not all students reach a focus at the same time. This stage is the most difficult and frustrating time for students at junior high. During this pre-focus stage teachers need to give their students more time than they have been in the past. Time is needed to personalize information and make links between what the student knows and what is still to be learned. If students do not reach a focus, they will not achieve this in the collecting information and presenting stages of the process as noted in this study. Therefore, proceeding on to the next stage when children do not have a limited topic will be

futile. This process requires much time and should not be rushed. As most subject areas have a considerable amount of content to cover, ways to cooperatively plan with other subject areas should be explored. Some students attach a negative connotation to the preparatory thinking that is needed to explore information and narrow a topic. They want to get on task and start writing notes. Frustration is a natural feeling at this stage and although not pleasant, may be part of the process. Therefore, getting students to relax at this stage is imperative.

Once students have picked a general topic they are then ready to collect information to explore for a specific focus. One technique to get students started as this stage is to get them to make an information retrieval plan (Eshpeter & Gray, 1989). This plan could list possible sources, subject headings and key words. This will help the students organize their search to find relevant material. Students may need to be taught how to and where to locate resources such as magazine indexes and audio-visual materials. Before any note taking occurs, students need to evaluate relevant information in the exploration of their topics. Teachers must give their students time to look at a wide range of materials to relax, read and reflect (Kuhlthau, 1985a). At this stage extensive notes and outlines should be deferred. Instead much consultation and discussion will be needed. Reading, viewing, listening, and observing strategies all need to be taught or reviewed so the students can choose relevant information from a variety of sources. Determining points of view, bias, accuracy and currency of information must be taught or reviewed so the information can be evaluated before it is used to form solutions, conclusions or decisions (Eshpeter & Gray, 1989).

All these strategies help students reflect on their topic and lead to forming a personal focus. Once this is done, then students can be taught how to organize, seek more pertinent information, record information and create a product.

Other Considerations for Teaching the Research Process:

Built into the research process, to ensure that students are experiencing success, is a need for structure and many checkpoints. Students in the concrete and early formal stages are still quite crude in their problem solving strategies and need practice to become more systematic in the process. Students need to be aware that the process is as important as the final product. Great inventions were not made after the first attempt. Learning from our mistakes and teaching children to reflect at these times leads to self-regulated learning. There needs to be a balance between the content students are learning and the process through which they are learning.

Cooperatively working with another teacher provides additional help in the classroom. The combination of the subject and resource expert can provide students with more assistance. The junior high school learner poses many challenges for the teacher. Not only are there different cognitive levels and learning styles of students at this age but, combined with adolescents undergoing physical, social and emotional changes, the challenge can be overwhelming. An extra teacher to conference with students having problems, going back and reteaching skills and strategies will result in a more individualized program.

There is a need for junior high school students to think through the research process by talking. Teachers and teacher-librarians who favor control and quiet environments will need to adjust to increased noise levels. Students at this age like to talk about their topics with friends, parents and teachers. Rather than fighting this natural need we have to find ways to tap into this method of learning. One example is to have students pair up with a friend to describe and explain their topic and focus and then have the friend ask questions and give suggestions. Imaginative and creative teachers can think of many strategies that would be effective.

Teachers need to be aware of students who hide their inabilities. Often students who demand our attention get more assistance leaving us little time to notice students who are having difficulties. As well we need to be aware of the varying reading levels in our classroom. What do we do with the nonreaders or low readers? Students that are having problems reading will have great difficulties researching and limiting a topic. Paired reading, peer tutoring and group work are ways to help these students through this process. The library must contain resources for a range of interest and reading levels for the topics students are researching. A policy for collection development should be discussed at staff meetings so that the library is focusing on the school's specific needs and not following a generic collection guide for junior high schools.

The image students have of the librarian in this study was quite interesting. Most students did not see the librarian as a person that could help them narrow a topic or define a search. A librarian was only needed to help find resources when students could not find these resources on their own. This image of the librarian as the "keeper of the books", on the peripheral of the school's activities and not part of the learning that was taking place in the classrooms, was quite evident with the students in this study. They did not view the library program as an integrated program between the classroom and the library. There is still needed work in explaining and clarifying the role of the teacher-librarian in some schools. Both teachers and students must see the teacher-librarian as equal educational partners cooperatively planning and teaching in all classrooms.

Considerations for School Policies

Getting staff input on the collection policy is necessary if the school library is to meet the needs of its students. Also important is to develop a school skills continuum for research that is consistent in all subjects. As the population and skill levels of the students

within the school change, the continuum should be adjusted every several years with input from the staff. The model in Focus on Research (Alberta Education, 1990a) stresses that each stage in the research process over time will develop from teacher directed at the introductory level to student directed at more advanced levels. Preparing Students for Information Literacy (Eshpeter & Gray, 1989), outlines how student information profiles or skills continuums can be developed in a school. The skills and strategies students learn in lower grades will help them become more self-directed in upper grades.

Time for the research process has already been mentioned. To practice this process and become proficient at researching, it must be taught more than one time in more than one subject area. Some teachers have a concern that to teach the research process properly takes valuable time away from teaching the content of the subject. One way to become more efficient in covering content is to hold grade group meetings and develop co-curricular units and themes that reduces the time needed for each topic and skill. A bonus of this approach is that students do not compartmentalize their knowledge into specific subjects but learn to transfer their ideas from subject to subject.

The importance of developing research and writing skills are a concern for all teachers. The amount of plagiarism that was observed in this study should be a concern for any junior high school teacher, if this is a representation of students at this age. Stressing that students put their thoughts in their own words should not be a concern only for the language arts teachers but of all teachers. Having students put their notes on narrow strips of paper and insisting that they use only phrases lessened the amount students copied from the original text and therefore, reduced the amount of plagiarism. There are many other strategies that teachers use which need to be discussed at staff and grade group meetings.

Summary

Our ultimate goal in school is to encourage and teach our students to be self-regulated learners. We know with increased technologies that we cannot possibly teach our students all that they will need to learn in their future years. Our students will have to be lifelong learners if they are to be successful. Methods and strategies for teaching metacognition in every subject in every grade should be further explored. Research assignments are just one method for teaching autonomous learning. However, if we want to become better skilled at teaching the research process we teachers and teacher-librarians must also be self-regulated learners and continue to reflect on the process and ways we can help our students learn for themselves.

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APPENDIX 1

STAGES OF THE
LIBRARY RESEARCH PROCESS

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 1

Initiating a Research Assignment

TASK	To prepare for the decision of selecting a topic.
THOUGHTS	Contemplate the assignment - Comprehend the task - Relate prior experience and learning - Consider possible topics.
FEELINGS	Apprehension of work ahead - Uncertainty.
ACTIONS	Talk with others - Browse library collection - Write questions about prospective topics.
STRATEGIES	Brainstorm - Discuss - Contemplate possible topics - Tolerate uncertainty.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 2

Selecting a Topic

TASK	To decide on a topic for research.
THOUGHTS	Weigh topics against criteria of personal interest assignment requirements, information available and time allotted - Predict outcome of possible choices - Choose topic with potential for success.
FEELINGS	Confusion - Sometimes anxiety - Brief elation after selection - Anticipation of prospective task.
ACTIONS	Consult with others - Make preliminary search of library collection - Use encyclopedia for overview.
STRATEGIES	Discuss possible topics - Predict outcome of choices - Use general sources for overview of possible topics.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 3

Exploring Information

TASK	To investigate information with the intent of finding a focus.
THOUGHTS	Inability to express precise information needed - Become informed about general topic - Seek focus in information on general topic - Identify several possible focuses.
FEELINGS	Confusion - Uncertainty - Doubt - Sometimes threat.
ACTIONS	Locate relevant information - Read to become informed - List interesting facts and ideas - Make bibliographic citations.
STRATEGIES	Tolerate inconsistency and incompatibility of information encountered - Intentionally seek possible focuses - List descriptors - Read to learn about topic.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 4

Forming a Focus

TASK	To formulate a focus from the information encountered.
THOUGHTS	Predict outcome of possible focuses - Use criteria of personal interest, requirements of assignment, availability of materials, and time allotted - Identify ideas in information from which to form a focus - Sometimes characterized by a sudden moment of insight.
FEELINGS	Optimism - Confidence in ability to complete task.
ACTIONS	Read lists for themes.
STRATEGIES	Make a survey of lists - List possible focuses - Choose a particular focus and discard others or combine several themes to form one focus.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 5

Collection Information

TASK	To gather information that defines, extends, and supports the focus.
THOUGHTS	Seek information to support focus - Define and extend focus - Gather pertinent information - Organize information in notes.
FEELINGS	Realization of extensive work to be done - Confidence in ability to complete task - Increased interest.
ACTIONS	Use library to collect pertinent information - Request specific sources from librarian - Take detailed notes with bibliographic citations.
STRATEGIES	Use descriptors to search out pertinent information - Make comprehensive search of various types of materials, i.e., reference, periodicals, nonfiction, biography - Use indexes - Request assistance from librarian.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 6

Preparing to Present

TASK	To conclude search for information.
THOUGHTS	Identify need for any additional information - Consider time limit - Notice decreasing relevance - Notice increasing redundancy - Exhaust resources.
FEELINGS	Sense of relief - Sometimes satisfaction - Sometimes disappointment.
ACTIONS	Recheck sources for information initially overlooked - Confirm information and bibliographic citations - Organize notes - Make outline - Write rough draft - Write final copy with footnotes and bibliography.
STRATEGIES	Return to library to make summary search.

STAGES OF THE

LIBRARY RESEARCH PROCESS:

Section 7

Assessing the Process

TASK	To evaluate the library research process.
THOUGHTS	Increase self-awareness - Identify problems and successes - Plan research strategy for future assignments.
FEELINGS	Sense of accomplishment or sense of disappointment.
ACTIONS	Seek evidence of focus - Assess use of time - Evaluate use of sources - Reflect on use of librarian.
STRATEGIES	Draw time line - Make flow chart - Discuss with teacher and library media specialist - Write summary statement.

Note. Teaching the library research process: A step-by-step program for secondary school students. by C. Kuhlthau, 1985, West Nyack, NY: The Center for Applied Research in Education. Copyright 1985 by C. Kuhlthau. Reprinted by permission.

APPENDIX 2

SAMPLE SURVEY, PERCEPTION QUESTIONNAIRE, STUDENT FLOW CHART AND FINAL EVALUATION FORM

Date _____ Number: _____

SAMPLE SURVEY

Initiation

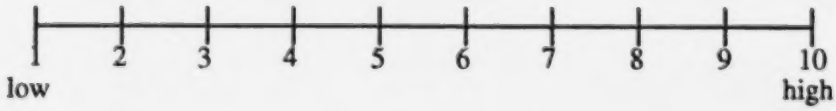
1. What are you looking for?

2. Describe the topic in a short paragraph.

3. What is the title of your project?

4. Who have you talked to about your project?

5. On the scale below indicate your confidence level at this point in the project.



6. From the adjective below, check those that describe how you feel at this point in the project.

- ☐ confident
- ☐ disappointed
- ☐ frustrated
- ☐ relieved
- ☐ sure
- ☐ others _____
- ☐ confused
- ☐ doubtful
- ☐ optimistic
- ☐ satisfied
- ☐ uncertain

What is your task now? Please check one box.

- ☐ To gather information that pertains to the specific topic.
- ☐ To investigate information on the general topic.
- ☐ To complete the information search.
- ☐ To recognize an information need.
- ☐ To formulate a specific topic.
- ☐ To identify the general topic.
- ☐ Other _____

What are you doing now? Check as many boxes as apply to you.

- ☐ Discussing the topic.
- ☐ Making a comprehensive search of the library.
- ☐ Browsing in the library.
- ☐ Outlining to organize information.
- ☐ Reading over notes for themes.
- ☐ Making a preliminary search of the library.
- ☐ Conferring with people who know about the topic.
- ☐ Asking librarian questions.
- ☐ Talking about themes and ideas.
- ☐ Making a summary search of the library.
- ☐ Skimming and scanning sources of information.
- ☐ Writing about themes and ideas.
- ☐ Reading about topic.
- ☐ Taking detailed notes on facts and ideas.
- ☐ Taking brief notes of facts and ideas.
- ☐ Rechecking sources for information initially overlooked.
- ☐ Recording bibliographic citations.
- ☐ Other _____

What are you thinking now? Check as many boxes as apply to you.

- ☐ Organizing ideas and information.
- ☐ Identifying possible alternative topics.
- ☐ Becoming informed about the general topic.
- ☐ Exhausting all possible sources of information
- ☐ Considering alternative topics in light of the information available to me.
- ☐ Choosing the broad topic that has the potential for success.
- ☐ Comprehending the task before me.
- ☐ Recognizing ways to draw project to close.
- ☐ Considering alternative topics in light of the time I have to complete the project.
- ☐ Choosing specific concentrations within the general topic.
- ☐ Considering alternative topics in light of the requirements of the project.
- ☐ Confronting the inconsistency and incompatibility in the information encountered.
- ☐ Getting more interested and involved in ideas.
- ☐ Defining and extending my specific topic.
- ☐ Gaining a sense of direction and clarity.
- ☐ Recalling a previous project when I searched for information.
- ☐ Predicting success of each possible concentration.
- ☐ Identifying several possible areas of concentration in the broad topic.
- ☐ Considering alternative topics in light of the things that are of personal interest to me.
- ☐ Seeking information about my specific area of concentration
- ☐ Other _____

Note. From "Longitudinal case studies of the information search process of user in libraries" by Carol Kuhlthau, 1988, Library and Information Science Research, 10(3) p. 303. Copyright 1988 by Carol Kuhlthau. Reprinted by permission.

Date _____ Number: _____

PERCEPTION QUESTIONNAIRE

The Information Search Process

	Almost Always	Often	Seldom	Almost Never
1. I have a clear focus for my topic before using the library	❑	❑	❑	❑
2. I find it helpful to talk to others about my topic.	❑	❑	❑	❑
3. My thoughts about my topic change as I explore information	❑	❑	❑	❑
4. I like to find everything I will need first and then read it	❑	❑	❑	❑
5. The library has the information I need.	❑	❑	❑	❑
6. A focus emerges as I gather information on a topic.	❑	❑	❑	❑
7. The information I find at the beginning of a search is confusing and doesn't fit in with what I know.	❑	❑	❑	❑
8. I take detailed notes from every source of information I look at.	❑	❑	❑	❑
9. I ask the librarian for direction in locating materials in the library/	❑	❑	❑	❑
10. A search is completed when I no longer find new information.	❑	❑	❑	❑
11. All of the sources of information I need are listed in the card catalog.	❑	❑	❑	❑
12. A search is completed when I find enough information.	❑	❑	❑	❑
13. I talk to people who know about my topic.	❑	❑	❑	❑
14. I become more interested in a topic as I gather information.	❑	❑	❑	❑
15. The information I need is in unexpected places in the library.	❑	❑	❑	❑
16. I make several trips to the library to research a topic.	❑	❑	❑	❑

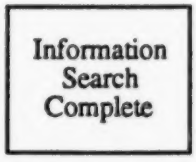
	Almost Always	Often	Seldom	Almost Never
17. I am successful in using the library.	❑	❑	❑	❑
18. I ask the librarian for advice on exploring a topic.	❑	❑	❑	❑
19. I ask the librarian for assistance in identifying materials.	❑	❑	❑	❑
20. I need materials other than books.	❑	❑	❑	❑

Note. From "Longitudinal case studies of the information search process of user in libraries" by Carol Kuhlthau, 1988, Library and Information Science Research, 10(3) p. 303. Copyright 1988 by Carol Kuhlthau. Reprinted by permission.

Date _____ Number: _____

STUDENT FLOW CHART

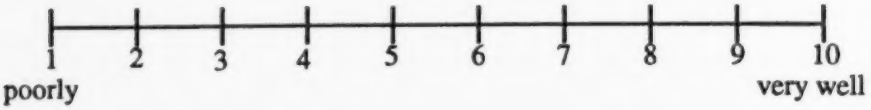
Make a Flow Chart of Your Library Search by Connecting Boxes



Note. From "Longitudinal case studies of the information search process of user in libraries" by Carol Kuhlthau, 1988, Library and Information Science Research, 10(3) p. 304. Copyright 1988 by Carol Kuhlthau. Reprinted by permission.

FINAL EVALUATION

On the scale below, indicate how well you used your research time.



Do you feel that you made the best possible use of the librarian? Why or why not?

What was the most useful thing you learned during this project about how to do research?

If you were starting this project again, what would you do differently?

How do you feel now that the project is over?

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APPENDIX 3

SAMPLE LETTER AND CONSENT FORM

SAMPLE LETTER

January, 1991

To: Parents

This is an invitation for your son/daughter to participate in a university study in the field of school libraries. Students in grades seven and eight will be preparing for a science fair project in March. Part of the preparation for this project is a library research paper. I would like to survey students at three points during the period they are working on their projects. The surveys are very straight-forward. Most responses require only a check mark. Permission for this project has been granted by Edmonton Public School through the Monitoring, Surveys, Research Unit.

The purposes of these surveys are

- to examine how students learn library research skills and strategies
- to determine how junior high school students limit a research topic.

Anonymity is assured for all students. The results of this study will be reported in general terms in the school newsletter so that you may be informed of the overall findings. Participating students may withdraw from this university study at any time without any penalty.

This type of research has not been done with junior high school students before. Therefore, I am very interested in the responses from your son/daughter. For further information about the study, please feel free to contact me at the school.

Sincerely,

Karen Loerke
Teacher
Student at the University of Alberta
Department of Elementary Education
School Libraries Program
438-9103

CONSENT FORM

PROJECT TITLE: An Understanding of the Development of the Focus in the Research Process

RESEARCHER: Karen Loerke, B.A., B.P.H.E., B. Ed.
Student at the Department of Elementary Education, University of Alberta

This is to certify that I give permission for my son/daughter to participate in this university study, the purpose of which is to examine how junior high school students work through a science library research project.

I consent to have my son/daughter complete three surveys at the initiation, midpoint and completion of his/her library research. The specific information from these surveys will be kept confidential and the results reported in general terms in the school newsletter after the responses have been analyzed.

I understand that my son/daughter has the right to withdraw from this university study at any time without any penalty.

_____
(Signature of Parent or Guardian)

I, _____ have read the above consent form and understand the contents of this study and am willing to participate in this research.

_____
(Signature of Participant)

_____
Date

_____
(Signature of Researcher)

APPENDIX 4

BREAKDOWN OF MARKS

CLASS _____

STUDENT'S NAME _____

BREAKDOWN OF MARKS

ESSAY

1.	Research Plan	/5
2.	Note Taking Exercise	/5
3.	Daily Response Journal	/10
4.	Limiting the topic	/10
5.	Notes / Categorization	/20
6.	Rough Draft	/25
7.	Good Draft	/25
		/100

DISPLAY AND PRESENTATION

1.	Display - backboard - model/experiment	/40
2.	Presentation to class - knowledge - method of explanation - speaking - interest generated	/40
3.	Evaluation - of peers - listening - summarize peers' presentations	/20
		/100

TOTAL /200